

SPEECH MONOGRAPHS

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SPEECH MONOGRAPHS

GRADUATE THESES—AN INDEX OF GRADUATE WORK IN THE FIELD OF SPEECH—VIII*

FRANKLIN H. KNOWER

State University of Iowa

SECTION I

A TOTAL of 504 graduate degrees are reported for the first time in this edition of the index. Masters' degrees comprise 459 of this total. The remaining 43 are Doctors' degrees. There were 252 Masters' degrees in the total granted with requirement of thesis; the other degrees were granted without requirement of thesis. The number of Masters' degrees granted with requirement of thesis in 1941 was 207. There are 45 Masters' degrees granted before 1941 reported for the first time in this list. The record of Masters' degrees granted in the field of speech and drama now includes 1860 degrees granted with requirement of thesis and 1792 degrees granted without requirement of thesis for a total of 3,652 degrees at this level. A total of 241 Doctors' degrees have been granted.

Table I records the institutional sources of graduate school degrees in this field, with separate tabulation of degrees of various levels, requirements, 1941 degrees, and totals. Thirty-four of the forty-one institutions reporting granted graduate degrees in 1941. Institutions listed for the first time in these reports include Baylor University, Michigan State College, Mills College, Redlands University, Washington State College, and West Texas State College. Degrees from the School of Drama of The University of Washington since 1931 are here added to those granted by the Division of Speech in that institution.

*The author wishes again to express his appreciation to teachers of speech in institutions cited for collaboration in supplying data for this report.

TABLE I
INSTITUTIONAL SOURCES OF DEGREES GRANTED
(1941 DEGREES IN PARENTHESES)

	MASTERS' DEGREES			DOCTORS' DEGREES	COMBINED TOTAL
	With Thesis	Without Thesis	Total		
Akron		2	2		2
Alabama	(7)	13	1		14
Baylor		6	6		6
Brooklyn	(2)	16	16		16
Carnegie		11	11		11
Columbia—T. C.		3	(49) 708	(6) 27	738
Cornell	(16)	121	121	(4) 28	149
Denver	(9)	47	47		47
George Washington		2	2		2
Grinnell		1	1		1
Hawaii	(2)	4	4		4
Illinois	(6)	11	11		11
Indiana	(2)	7	7		7
Iowa	(30)	445	445	(8) 56	501
Louisiana	(9)	70	70	12	82
Marquette	(5)	28	28		28
Michigan State	(3)	3	3		3
Michigan, Univ. of	(18)	27	(46) 485	(6) 28	540
Mills	(2)	2	(1) 1		3
Minnesota	(3)	44	(1) 6	(1) 2	52
Missouri	(2)	8	8		8
New Mexico Normal		8	8		8
Northwestern	(5)	249	(60) 164	(6) 13	426
Ohio State	(5)	38	38	(1) 3	41
Ohio University	(1)	7	7		7
Ohio Wesleyan		26	26		26
Oklahoma	(7)	10	10		10
Purdue	(1)	6	(3) 3		9
Redlands	(2)	3	3		3
South Dakota	(1)	4	4		4
Southern California	(6)	156	(29) 254	(3) 15	425
Stanford	(5)	26	26	1	27
Syracuse	(4)	12	(1) 1	1	14
Utah	(4)	21	21		21
Washington State Col.	(3)	9	9		9
Washington, Univ. of	(10)	63	63		63
Wayne	(2)	31	9		40
Western Reserve		1	(19) 84		85
West Texas	(1)	1	1		1
Wisconsin	(19)	261	261	(7) 49	310
Yale	(15)	57	76	(1) 6	139
GRAND TOTALS	(207)	1860	(209) 1792	(43) 241	3893

Table II contains a rough classification of degrees into major areas within the field. Only minor changes in the total percentage of degrees granted in any area occur as a result of the additions of this index.

TABLE II
THESES CLASSIFIED BY SUBJECT MATTER

		Previous Lists	New List	Total
Fundamentals	Master's—Number	200	26	226
	Percent	12.45	10.25	12.15
	Doctor's—Number	46	4	50
	Percent	23.23	9.35	20.75
Public Speaking	Master's—Number	249	27	276
	Percent	15.49	10.68	14.85
	Doctor's—Number	60	12	72
	Percent	30.30	28.00	29.85
Oral Reading	Master's—Number	61	7	68
	Percent	3.80	2.77	3.68
	Doctor's—Number	1		1
	Percent	.51		.40
Dramatics	Master's—Number	651	136	787
	Percent	40.51	53.80	42.25
	Doctor's—Number	36	13	49
	Percent	18.18	30.00	20.35
Speech Defects	Master's—Number	146	21	167
	Percent	9.09	8.30	9.00
	Doctor's—Number	22	8	30
	Percent	11.11	18.65	12.50
Education	Master's—Number	281	36	317
	Percent	17.49	14.20	17.05
	Doctor's—Number	29	6	35
	Percent	14.65	14.00	14.50
Miscellaneous	Master's—Number	19		19
	Percent	1.18		1.02
	Doctor's—Number	4		4
	Percent	2.02		1.65

Section II consists of a list of theses titles classified by institutions and type of degree granted, and arranged alphabetically by thesis author's name within the year. Titles are given numbers in sequence from titles in Number VII of this series. Section III contains an index of the thesis numbers classified under captions of six major academic areas in the field. Doctors' theses are designated by an asterisk following the number and indexed first under each heading. Many titles are listed in more than one area. The last lines of the index are devoted to the thesis numbers listed in sequence by the institutions granting the degrees.

SECTION II

TITLES

UNIVERSITY OF ALABAMA

1941

M.A. Theses

1806. Anthony, Nina Jo, A Survey of Speech Education in the Secondary Schools of Alabama.
1807. Chenault, Lucile Leigh, A Classification of Speech Defects with their Clinical Diagnosis: A Manual for Student Clinicians.
1808. Duggar, Mary Morgan, The Theatre in Mobile, 1822-1860.
1809. Harton, Margaret, *And So They Laugh*, (Production thesis of an original three-act play.)
1810. James, Kathrina Brown, A Handbook of Speech Training for the Elementary Teacher.
1811. Logan, Virgil Glen, A Survey of the Methods of Teaching Gesture as Found in the Speech Texts of the Nineteenth Century.
1812. Miller, George Armitage, A Study of the Effect of Selective Filtering on Discrimination of Consonant Sounds.

BAYLOR UNIVERSITY

1923

M.A. Thesis

1813. Lowrey, Sara, The Vocal Interpretation of Literature.

1939

M.A. Theses

1814. Hanchey, Helen Margaret, Drama Prompted by Religious Attitudes to be Produced by a Religious Education Department.
1815. Hubbard, Evelyn, A Study of the Speech Institute as Conducted by Universities for High School Students.

1940

M.A. Theses

1816. Burke, Cecil May, An Experiment in the Comparison of the Amount of Appreciation Gained from Poetry Read Silently as Compared with That Gained from Hearing the Same Poetry Interpreted Orally.

1817. Butler, Nellie Louise, A Comparison of the Broadcasting Activities of Texas Colleges with That of Ten Out-of-state Universities.
1818. Page, Clayton R., A Comparative Survey of the Introductory Course in Speech.

BROOKLYN COLLEGE

1941

M.A. Theses

1819. Danwitz, Helen Joan, An Experimental Study of the Correlation between Degree of Speech Ability and Personality Traits.
1820. Ullman, Grace, Richard Mulcaster, A Late Sixteenth Century Phonetician.

COLUMBIA UNIVERSITY
TEACHERS COLLEGE

1941

Ph.D. Theses

1821. Aly, Bower, Alexander Hamilton, A Study in Persuasion.
1822. Fatherson, Elizabeth, Dramatic Activities and Preferences of Children from Two Social-Economic Backgrounds.
1823. Ogilvie, Mardel, Terminology and Definitions of Speech Defects.
1824. Robb, Margaret, The Teaching of Oral Interpretation in the Colleges and Universities of the United States.
1825. Spadino, Egbert, The Writing and Laterality Characteristics of Stuttering Children.

Ed.D. Thesis

1826. Allardyce, Agnes, Proposed Procedure in Planning a Program of Speech Education in an Integrated Curriculum for Westfield, New Jersey.

CORNELL UNIVERSITY

1941

M.A. Theses

1827. Avant, David Alonzo, Staging Requirements of George Bernard Shaw's Plays.
1828. Bonner, Ruth Eleanor, A Course of Study in Speech for Secondary Schools.

1829. Burdick, Robert Van Buren, Symbolism in the Drama: Being an Investigation of a Literary Movement Particularly in France as it Affected the French Theatre from 1890 to 1914.
1830. Crouch, Jack Herbert, Dion Boucicault in the American Theatre.
1831. Hayward, Wayne Clinton, Essay: Solomon Franklin Smith, Pioneer American Actor-Manager.
1832. Heinbockel, Margaret Hermine, Drama.
1833. Hopkins, Kate Langley, Fanny Kemble's Theory of the Theatre.
1834. LaBella, Senatro Dominik, Carlo Goldoni.
1835. Leff, Henry Stuart, Maurice Schwartz and the Yiddish Art Theatre.
1836. Malmgren, Jane, An Interpretation of Chekhov and His Plays.
1837. Mettler, Isabel Riexinger, August Strindberg, and His Plays.
1838. Philippi, Herbert, Adaptations, Notes, and Designs for Modern Productions of *Ralph Roister Doister*, *Epicoens*, or *the Silent Woman*, and *The Gentleman Dancing Master*.
1839. Putnam, Irma Solomon, William Charles McCready, Actor-Manager.
1840. Rogers, Virginia Paine, The History and Methods of the Moscow Art Theatre, 1898-1941.
1841. Schneider, Alan Leo, Nicolas Evreinov and *The Theatre in Life*; A Translation and an Introductory Study.
1842. Scott, Rita Virginia, The Speech of the Theatre.

Ph.D. Theses

1843. Curvin, Jonathan Wadhams, The Realistic Tradition in American Art and Drama.
1844. Fife, Hilda Mary, *Gli Asolani* by Pietro Bembo: A Translation with an Introduction.
1845. Magill, Thomas Nelson, Character in the Drama.
1846. Soper, Paul Leon, Aesthetics and the Modern Theatre.

UNIVERSITY OF DENVER

1941

M.A. Theses

1847. Camilla, Sister Mary Montgomery, *Mary, His Mother*, an original religious play.

- 1848. deBoer, Ray, A Comparison of the Speech Reaction Time of More Objective with More Egocentric High School Speakers.
- 1849. Ellsworth, Helen Marie, A Study of the Validity of the Miller-Murray Personal-Social Adjustment Test for Speech.
- 1850. Phelps, Waldo, A Comparison of Debate with Discussion for Allness Behavior.
- 1851. Scott, George, The Construction and Testing of an Ink-Stylus Kymograph for Speech.
- 1852. Sheehan, Sister Mary Seraphine, *The Heynal*, an original play.
- 1853. Steinhardt, Gertrude Margaret, Dramatic Episodes in the History of the Denver Tabor Grand Opera House.
- 1854. Williams, William, A Semantic Analysis of the Broadcasting of Five Radio Commentators.
- 1855. Wilson, Mabel Louise, A Comparison of Oral Reading and Extemporaneous Speaking Rates of Elementary School Children.

UNIVERSITY OF HAWAII

1941 •

M.A. Theses

- 1856. Bricker, Ruth (Mrs.), A Study of the Reliability of Teachers' Ratings of Recorded Speech at the University of Hawaii.
- 1857. Wright, Norman J., A Comparative Study of Teachers' Ratings of Recorded Speech and Speech Delivered in Person.

UNIVERSITY OF ILLINOIS

1941

M.A. Theses

- 1858. Angell, Clarence S., An Experimental Analysis of the Effectiveness of some of the Methods of Relaxation Used in Speech Correction.
- 1859. Friedman, Harriet Miriam, Nasality and Nasal Resonance as Correlated with the Firmness of the Velar-Pharyngeal Occlusion.
- 1860. Goldman, Olive R., Religious Drama in Twentieth Century England.
- 1861. Kincaid, Gerald L., Lines of Argument in Robert G. Ingersoll's Lecture on Religion.

- 1862. Schooley, Mary Francis, Theories of Hearing, Audiometric Techniques, and Hearing Aids: Their Origin and Development.
- 1863. Shere, Marie Orr., The Rehabilitation of the Speech of Spastics.

INDIANA UNIVERSITY

1941

M.A. Theses

- 1864. Hawthorn, Margaret E., Speech Sound Discrimination as Related to Defective Articulation After Visible Sounds Have Been Eliminated.
- 1865. Stilz, Mildred, Life in Seventeenth Century England, and Its Relation to Costuming.

STATE UNIVERSITY OF IOWA

1941

M.A. Theses

- 1866. Abel, Ray H., A Project and Preliminary Investigation of Problems Involved in Producing a Play for Television.
- 1867. Alogdelis, Joanna, An Analysis of the Audience Adaptation Techniques in the Political Speeches of Norman Thomas in the Campaign of 1940.
- 1868. Alusow, Frank Telespore, A Validation of the Gilkinson-Knower Guidance Questionnaire on University of Iowa Freshman Speech Students.
- 1869. Amidon, Hilda Farnum, A Statistical Study of Articulatory Errors Made by One Hundred First Grade Children.
- 1870. Bede, James Bradley, John Cardinal Newman's Philosophy of Speech.
- 1871. Bowman, Georgia Bessie, A Comparative Analysis of the Vocabulary in Certain Compositions and Author-interviews.
- 1872. Bradford, Clinton William, Experimental Production of Three Original One-act Plays About Folk Life in Arkansas.
- 1873. Brandenburg, Earnest, An Analysis and Criticism of the Argumentative Techniques of Jonathan P. Dolliver in the Senate Tariff Debates of 1909.
- 1874. Butcher, James William, A Curriculum in Dramatic Art for Howard University, Washington, D. C.
- 1875. Christopher, Wilford Scott, A Comparative Analysis of Stylistic Differences in Certain Compositions and Author-interviews.

1876. Corrigan, Robert Ford, A Design Project for a Production of *Quality Street*, by James M. Barrie.
1877. Felton, Aline Stotts, Director's Study and Prompt Book of Alexander Dumas' *Camille*.
1878. Felton, Norman Francis, Experimental Production of Three Original One-act Plays.
1879. Gulley, Halbert Edison, A Study of the Relative Effectiveness of Debate and Discussion Upon Audience Opinion.
1880. Henneke, Ben, A Director's Study and Prompt Book of John Howard Payne's *Brutus*.
1881. Hoover, Earl G., A Director's Prompt Book and Designs for Bulwer-Lytton's *Richelieu*.
1882. Keefe, Martha Jean, A History and Evaluation of the Use of Drama in the Protestant Churches of the United States from 1916-1939.
1883. Lyle, Harry Mason, The Speech Education of Daniel Webster.
1884. Olsen, Donald M., A Study of the Speech Defects of Institutional Mentally Defective Children.
1885. Ostby, Norma Gooden, A Study of Relief Devices in Some Works of Contemporary Playwrights.
1886. Phifer, Lyndon Gregg, Analysis of the Logical Pattern in Representative University of Chicago Round Table Discussions.
1887. Phillips, David Clarence, Comprehension of Expository Material Presented in Speaking.
1888. Porter, E. Keith, A Director's Study and Prompt Book of William Congreve's *The Old Bachelor*.
1889. Redford, Grant H., Experimental Production of an Original Play.
1890. Ritzman, Mabelmae Wilson, A Study of Existing State and Federal Legislation Which Provides for the Training of Speech Defectives.
1891. Roberts, John Buckley, The Speech Philosophy of Clarence Darrow.
1892. Roskam, William Elmer, A Critical Analysis of the Proof Used in Selected "Four-Minute" Speeches.
1893. Whitcomb, Bess Hyde, A Stage Director's Study of *Abe Lincoln in Illinois* by Robert Sherwood.
1894. Zimmerman, Joe Russell, Design and Execution of the Stage Lighting for *Francesca da Rimini*.

M.F.A. Thesis

1895. Winnie, John Ross, The Community Theatre as a Social Institution.

Ph.D. Theses

1896. Andersch, Elizabeth Genevieve, An Objective Analysis of Speech Experience.
1897. Curry, Herbert La Vere, John C. Calhoun: Speaker.
1898. Fossum, Ernest C., An Analysis of Certain Characteristics of Oral Language Vocabulary of Junior College Students.
1899. Free, Joseph Miller, The Theatre of Southwestern Mississippi to 1840.
1900. Gallaway, Marian Hesse, Development of Skills in Plot Construction: A Study of Plays by a Group of Living American Dramatists.
1901. Lee, Warren Marion, Experimental Production of Three Original Plays Interpretative of the Farm Life of the Midwest.
1902. Ritzman, Carl Harry, A Comparative Cardio-vascular and Metabolic Study of Stutterers and Non-stutterers.
1903. Thomas, Ota, The Theory and Practice of Disputation at Yale, Harvard, and Dartmouth from 1750 to 1800.

LOUISIANA STATE UNIVERSITY

1941

M.A. Theses

1904. Bloom, Leon, A Study of Increase in the Auditory Memory Span for Speech Sounds.
1905. Davis, Virginia, A Survey of Dramatic Activity in Certain Churches of Georgia Today.
1906. Greene, Mary Elizabeth, An Analysis of the Dramatic Criticisms of Stark Young.
1907. Moore, Ralphine, An Analysis of the Orthographic Symbolizations of the English Vowel Phonetics.
1908. Morris, Virginia, The Influence of Delsarte Philosophy of Expression as Revealed through the Lectures of Steele MacKaye.
1909. Neal, Audra Evans, A Study of the Relation of the Strength of the Respiratory Musculature to Audibility in Speech.
1910. Nicholson, Martha, A Comparison of Early and Recent Criticisms of Henrik Ibsen.

1911. Price, Navalynne, The Delsarte Philosophy of Expression as Seen Through Certain Manuscripts of the Rev. Dr. William R. Alger.
1912. Vallery, Floyd, Intra-Syllabic Consonant Combinations in Conversation.

MARQUETTE UNIVERSITY

1940

M.A. Theses

1913. Burkardt, Edith Jean, History and Present Status of the Correction of Stuttering.
1914. Elsen, William J., Alfred Emanuel Smith, The Orator.
1915. Garrett, Sister Xavier Marie, Valiant Woman. (A Play)
1916. Kotrodimos, Netsa Adrian, Karl Schurz, The Orator.
1917. Willard, Louise, The Lure of the Suwanee. (A Play)

UNIVERSITY OF MICHIGAN

1941

M.A. Theses

1918. Baker, F. Vandalia, Abraham Lincoln and His Change of Style.
1919. Beall, Paul R., A Comparative Rhetorical Analysis of Representative Speeches of W. M. Evarts with Respect to Arrangement.
1920. Bilto, E. William, A Comparative Study of Certain Physical Abilities of Children with Speech Defects and Children with Normal Speech.
1921. Bondurant, Mary Katherine, Methods of Teaching Speech.
1922. Cairns, Paul, Theodore Roosevelt, the Speaker.
1923. Connor, Whitfield, An Essay Toward a New Pedagogy of the Teaching of Speech.
1924. Hanson, Marion Esther, A Study of Winston Churchill as an Orator.
1925. Holland, L. Virginia, A Comparison of the Motive Appeals of Willkie and Roosevelt as Evidenced from Six Speeches in the Campaign of 1940.
1926. Jones, Lucy, Women's Costumes of the Nineteenth Century.
1927. Kenesson, Evelyn Pearl, A Study of the Speech Style and Delivery of James Burrell Angell.
1928. McGillivray, Roy A., A Survey of Speech Education in Junior Colleges of New England.

1929. Norton, Hugh Z., Richard Mansfield, Actor: A Critical Study of His Career and Major Rôles with a Consideration of His Contributions to the American Theatre.
 1930. Odell, Ralph D., Investigation of Possible Correlation between the Occurrence of Childhood Diseases and Speech Defects of a Subnormal Speech Defective Group and a Normal Speaking Group.
 1931. Parrish, Marta, A Study of Sigmatic Defects.
 1932. Schwarzwald, John, The Court Masque in Stuart England.
 1933. Sullivan, Edward Joseph, A Study of the Summer Theatre Movement.
 1934. Wargelin, Sylvia R. E., The Contributions of Maxwell Anderson to Modern Drama.
 1935. Wibel, Mary E., Juliet, 1865-1904.
- Ph.D. Theses*
1936. Manchester, Mary Jane, The Antecedents of Specificity and the Integrant Factors in Syllabic Emergence.
 1937. Miller, Enid Wyman, An Objective Classification, Analysis, and Comparison of Speech Materials in Relation to Speech Purposes as Demonstrated in Some of the Public Addresses of a Group of Outstanding American Statesmen.
 1938. Mills, Glen Earl, Daniel Webster's Theory and Practice of Public Speaking.
 1939. Reid, Norman Mackenzie, E. L. Davenport.
 1940. Secord, Arthur E., An X-Ray Study of the Hyoid Bone, the Thyroid Cartilage, and the Cricoid Cartilage in Relation to Pitch Change in the Human Larynx.
 1941. Strawn, Robertson, Public Speaking of the Iroquois.

MICHIGAN STATE COLLEGE

1941

M.A. Theses

1942. Luick, Wilbur F., An Experimental Study of the Value of Motion Pictures as a Teaching Aid in Beginning Classes in Public Speaking.
1943. Shea, William, Production Problems of *Twelfth Night* by William Shakespeare: A Study of Traditional Settings and Suggested Designs for a Unit Set.
1944. Thomas, Gordon, A Subjective and Objective Evaluation of the Use of Motion Pictures as a Teaching Device in Public Speaking with Special Reference to Transitions and Loss of Eye Contact.

MILLS COLLEGE

1941

M.A. Theses

1945. Caverly, Millis, *The Runaways*. (An Original Play)
1946. Davis, Virginia Vee, *Inquiry into the Functioning of the Theater as a Social Force in Some American Social Settlements*.

UNIVERSITY OF MINNESOTA

1941

M.A. Theses

1947. Durkee, Barbara Lee, *Central Characterization Technique Used by the American Playwrights Whose Plays Were Produced on Broadway Between 1918 and 1928*.
1948. Leyden, Ralph, *An Experimental Study of the Effects of Speech Training at the Secondary School Level*.
1949. Thompson, David, *A Record and Analysis of the Staging of Shakespearean Plays on the New York Stage From 1899-1940*.

Ph.D. Thesis

1950. Whiting, Frank M., *A History of the Theatre in St. Paul, Minnesota from its Beginning to 1890*.

UNIVERSITY OF MISSOURI

1941

M.A. Theses

1951. Mueller, Henry Lancaster, *A Phonetic Study of Suffixes in American English*.
1952. Rank, Maude Agnes, *Lord Rosebery and the House of Lords*.

NORTHWESTERN UNIVERSITY

1941

M.A. Theses

1953. Fotheringham, Wallace, *A Study of the Abilities of Teachers to Detect Articulatory Speech Defects, with and without the Aid of a Speech Testing Manual*.
1954. Gober, Ruth, *The Professional Theatre in Oklahoma City, 1889-1941*.
1955. Howard, Gordon D., *The Relationship of Posture to Breathing*.
1956. Thorsen, John Kehl, *A Project for the Staging of Four Nativity Plays from the English Miracle Cycles*.

1957. Vernon, Jean Clapp, A Comprehensive Study of the Speech Situation at Children's School, National College of Education, 1939-1940.

Ph.D. Theses

1958. Bell, William Campton, A History of the Denver Theatre during the Post-Pioneer Period, 1881-1901.
 1959. Bryant, Pearl, Speech Re-education in the Nineteenth Century.
 1960. Maloney, Martin, Clarence Darrow's Forensic Speaking.
 1961. Mitchell, Lee Joseph, Elizabethan Scenes of Violence and the Problem of Their Staging.
 1962. Sattler, William M., Conceptions of *Ethos* in Rhetoric.
 1963. Wrage, Ernest J., An Investigation of the Speaking and Speeches of Henry Clay.

OHIO STATE UNIVERSITY

1941

M.A. Theses

1964. Arms, George Lyman, Do High School Plays Educate Adolescents?
 1965. Bang, Dorothy Bangham, Mrs. Fiske's Contribution to Realistic Acting Through the Dramas of Henrik Ibsen.
 1966. Merrick, Mary Louise, A History of the Theatre of Zanesville, Ohio, Between the Years of 1831 and 1866.
 1967. Mill, Marie Elliott, The Contribution of Edmund Kean to the Art of Realistic Acting.
 1968. Reiner, Aileen, Contributions of the University of North Carolina to the American Drama (1918-1935).

Ph.D. Thesis

1969. Mason, Marie Katherine, Dissertation: A Cinematographic Technique for Testing More Objectively the Visual Hearing Comprehension of Young Deaf and Hard of Hearing Children.

OHIO UNIVERSITY

1941

M.A. Thesis

1970. Cohron, Joseph Wenger, An Investigation into the Origin and Development of the Director of Dramatic Production: An Historical Study Indicating the Director's Position in Dramatic Production of the Future.

UNIVERSITY OF OKLAHOMA

1941

M.A. Theses

1971. Gamble, Barbara, A Preliminary Study of the Relationship Between the Intensity and the Intelligibility of Certain Speech Sounds.
1972. Kelly, Mrs. Katharine Boren, A Speech Rehabilitation Workbook for Spastics.
1973. Kretsinger, Elwood Arthur, An Interpretative Analysis of Browning's "Andrea del Sarto."
1974. Kretsinger, Mrs. Geneva Buchanan, An Analytical Study of Selected Radio Speeches of Eleanor Roosevelt.
1975. Robertson, Myra Carson, An Interpretative Analysis of Euripides' *Trojan Women*.
1976. Robins, Marjorie Alice, A Study of Emotional Appeal in Radio Commercials Designed for Women Listeners.
1977. Wasson, Ralph Arden, A Study of the Speaking Career and Speeches of Thomas Pryor Gore.

PURDUE UNIVERSITY

1941

M.S. Thesis

1978. Marks, Samuel Milton, An Experimental Method for Evaluating Textual Changes in Public Speeches.

UNIVERSITY OF REDLANDS

1940

M.A. Thesis

1979. Wedberg, C. F., Historical Development of Causal Theories and Remedial Procedures in Stuttering.

1941

M.A. Theses

1980. Hasty, C. G., Design for Drama: A Study and Analysis of Theater Design.
1981. Parker, William, The Career of Wendell L. Willkie and its Speech Implications.

SOUTH DAKOTA UNIVERSITY

1941

M.A. Theses

1982. Stier, Bernice, Director's Manual and Prompt Book for Shakespeare's *Much Ado About Nothing*.

UNIVERSITY OF SOUTHERN CALIFORNIA

1941

M.A. Theses

1983. Douglas, Franklin Charles, An Examination of the Personality Characteristics of Participants in Forensic Activities.
1984. Enfield, Celeste Gertrude, Five Original Monodramas in a Series Entitled "The Honorable Cynthia Houston."
1985. Lloyd, Mark Brooks, An Analysis of the Pulpit Oratory of Phillips Brooks.
1986. Schultz, Donald Arthur, A Motion Picture Study of Homophonous Sounds.
1987. Scott, Lionel Robinson, A Study of the Origin and Development of the Disputation in Universities and Colleges.
1988. Shalda, Evelyn Dalrymple, An Analysis of Speech Defects as Presented to and Treated at the California Babies Hospital.

Ph.D. Theses

1989. Evans, Edmund Emil, A Historical Study of the Drama of the Latter Day Saints.
1990. Freestone, Norman William, An Electroencephalographic Study on the Moment of Stuttering.
1991. Hahn, Eugene F., A Study of the Influence of Variations in the Social Complexity of Oral Reading Situations, of Phonetic and Grammatical Factors, and of Remedial Treatment upon Stuttering Frequency.

STANFORD UNIVERSITY

1941

M.A. Theses

1992. Bell, Mildred Alladine, *The Last American*, (an original full-length play.)
1993. Bergman, Virgil, *The Scholarly Theories of the Origin of Greek Tragedy*.
1994. Glyer, Richard Theodore, *Frank Bacon and his Work in the Theatres of the West. (1880-1910)*

1995. Rogers, Virginia Marion, Caroline Chapman, American Actress: Her Contributions to the San Francisco Stage.
1996. Young, Helen Ann, A Study of the Characters and Methods of Characterization which Henry Arthur Jones Employed in his Plays.

SYRACUSE UNIVERSITY

1941

M.A. Theses

1997. Bitz, Nellie Edith, A Half Century of Theatre in Early Rochester.
1998. Foster, Eugene Stuart, A Classification for Analyzing the Content of Informal Group Discussions.
1999. Kohler, Katharine Barbara, The State of the Drama in the Rochester Lyceum Theatre, 1912, 1913, 1914.
- 2000. Scanlon, Paul Francis, Andre Birabeau and His Place in the Modern French Theatre.

UNIVERSITY OF UTAH

1941

M.A. Theses

2001. Hallinan, Sister M. Judith Therese, A Study of Six of the Most Widely Used Translations of Dante's "Inferno" to Determine Their Relative Suitability for Oral Interpretation.
2002. Sheets, Boyd Verne, A Study of the Visual Perseverative Tendencies in Stutterers and Normal Speakers.

M.S. Theses

2003. Gold, Glenn Sidney, A Study of Auditory Perseverative Tendencies in Stutterers and Normal Speakers.
2004. Likes, Lewis Clair, A Three-act Play, "Caviar and Cabbage."

STATE COLLEGE OF WASHINGTON

1932

M.A. Theses

2005. Baldemor, Dionisio Nievers, A Study of the Types of Oratory Growing Out of the Spanish-American War.
2006. Worley, Virginia Wichmann, Local Color and Folk Lore in American Drama.

1937

2007. Buchanan, Katie Maree, *The Yankee in American Drama*.
 2008. Ladd, James William, *Survey of the Legitimate Theater in Seattle Since 1856*.

1939

2009. Howell, Norman S., *Preparation of a Prompt Book for Certain Studies of, and the Final Presentation of, Gammer Gurton's Needle*.

1940

2010. Vivian, James, *Prompt Book and Production of Light O' Love* by Schnitzler.

1941

2011. Harding, George Jasper, *A Prompt Book and Production Thesis of Comrades—A Four-act Drama by August Strindberg*.
 2012. Sandberg, Robert, *Prompt Book and Production of Ghosts* by Henrik Ibsen.
 2013. West, Gladys E., *Preparation of Prompt Book for, and Presentation of Shakespeare's The Winter's Tale*.

UNIVERSITY OF WASHINGTON

1931

M.A. Thesis

2014. Day, Florence May, *History of Censorship of the New York Stage*.

1934

M.A. Theses

2015. Hill, Naomi Harron, *Politics in the American Drama*.
 2016. Sanwick, Helen Marguerite, *The Development of the Negro Character in American Drama from 1767 to 1934*.

1935

M.A. Theses

2017. Bayles, Edith Rosa, *Adolph Appia's L'oeuvre d'art vivant: Introduction and Translation*.
 2018. Savage, George Milton Junior, *Regionalism in the American Drama*.
 2019. Stevenson, Margaret Whyte, *A Century and a Half of the American Stage Indian*.

1937

M.A. Theses

- 2020. Cartwright, Marjorie Eleanor, The Contribution of William Gillette to Realism in American Drama.
- 2021. Douglas, Margaret Simpson, The "Fallen Woman" in American Drama and on the American Stage.
- 2022. Lake, Lucille, International Marriage in American Drama.
- 2023. Mangan, Nora, Augustin Daly as a Producer of Shakespearean Drama.
- 2024. Minter, Laurabelle, An Analysis of William Winter's Dramatic Opinion Published in the New York Tribune from 1900 to 1909.
- 2025. Stevenson, Tom, Theatre in the Society Islands.
- 2026. Vandraegen, Daniel E. R. (Rosenberg), A Critical Survey of English Domestic Tragedy 1578 to 1793.
- 2027. Vogt, Virginia Carli, Minnie Maddern Fiske—A Survey of Her Life and Her Work and an Estimate of Her Contribution to the American Theatre.

1938

M.A. Theses

- 2028. Bailey, Sarah Elizabeth, Edward Sheldon's Influence on American Drama.
- 2029. Berneis, Peter, Trends of Acting and Representative Actors in the American Theatre Today.
- 2030. Burd, Jacqueline, A Hand-Book of Costume Construction.
- 2031. Gray, Robert, Dion Boucicault and His Contribution to American Drama.
- 2032. Jenkins, Helena, The Contribution of Edward Harrigan to the American Drama with Special Emphasis on the Irish Type.
- 2033. Ryan, Catherine Patricia, Clyde Fitch, The First Cosmopolitan in American Drama.
- 2034. Sparrow, Wilbur Daniel, A Survey of the Life and Work of Edward William Goodwin and its Relationship to Ellen Terry and Edward Gordon Craig.
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- 2036. Beck, Martha, An Estimate of Brander Matthews as Teacher, Writer, and Critic in the Field of Drama.

- 2037. Gilmore, James, The Contribution of Eugene Walter to American Drama.
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- 2040. Rohrer, Mary Kay, The History of Seattle Stock Companies from their Beginnings to 1934.
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- 2046. Stephens, Thelma Ethel, Bibliography of Puppetry.

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- 2047. Argall, Ruth Marie, A Study of the High School Auditorium Program in Relation to Speech Education.
- 2048. Elliott, Eugene Clinton, History of the Variety Vaudeville in Seattle From the Beginning to 1914.
- 2049. Enquist, Lucille Engdahl, A Study of Training Methods as Revealed in the Standard Texts of Speech Correction for Primary Age Children with Articulatory Defects of Speech, and the Presentation of a Suggested Program for the Correction of These Defects. (Done jointly with Charlotte Estelle Fitton)
- 2050. Fitton, Charlotte Estelle, A Study of Training Methods as Revealed in the Standard Texts of Speech Correction for Primary Age Children with Articulatory Defects of Speech, and the Presentation of a Suggested Program for the Correction of These Defects.

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- 2071. Trione, Phyllis Anne, A Survey of Speech Education in the Small High Schools of Wisconsin with Implications for Prospective Teachers of Speech.
- 2072. Wilson, Julia Anne, An Approach to Speech Through Movement.

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- 2081. Crowley, Mother M. Margaret, Bourke Cochran, Orator.
- 2082. Greaves, Halbert S., Public Speaking in Utah, 1847-1869.
- 2083. McCoard, William B., Speech Factors As Related to Teaching Effectiveness.
- 2084. Sterrett, James Reid, A Comparative Analysis of Certain Language Elements Used by Speakers and Writers.
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AN ELECTROENCEPHALOGRAPHIC STUDY ON THE MOMENT OF STUTTERING*

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I. INTRODUCTION

ELECTROENCEPHALOGRAPHY has established the fact that cortical brain cells discharge spontaneously and automatically. This fact was first discovered by Berger,¹ and later completely confirmed by Adrian.² The electroencephalogram gives a complete electrical picture of cortical activity at any given moment.

Frequency, voltage and form fluctuations are the main criteria used for determining the state of the discharging brain tissue. The complicated electrical activity of the brain is regarded as a *pattern* of electrical behavior rather than a series of discrete and separate factors. Beta activity is a universal feature of all records and is present all over the living brain. It consists of electrical discharges above twenty cycles per second. It is a formless low voltage activity from which all other patterns emerge. It is difficult to alter by changes in psychological and physiological states.

Alpha activity emerges as a relatively high order of synchronization of spontaneous nerve cell discharges. It is around ten cycles per second, sinusoidal in form, relatively high in voltage and is best seen from the occipital regions of the brain. It is readily affected by changes in psychological and physiological states.

Both the alpha and beta patterns are indicative of normal brain functioning. Abnormalities in the electroencephalogram are revealed in disorganization of these patterns. As abnormality increases, the normal patterns break up into episodes which involve a remarkable assortment of configurations comprising extremes of frequency,

*This study is, in substance, a dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at the University of Southern California. The author wishes to express his indebtedness to Professor L. E. Travis, who suggested and directed this research, to the authorities of the Children's Hospital at Los Angeles, who gave him the opportunity to use the electroencephalograph, and to the individuals who served as subjects.

¹ Berger, H., "Über das Elektrenkephalogramm des Menschen, I," *Arch. f. Psychiat. u. Nervenkr.*, LXXXVII (1929), 527-570.

² Adrian, E. D., and Matthews, B. H. C., "The Berger Rhythm: Potential Changes from the Occipital Lobes of Man," *Brain*, LVIII (1935), 323-351.

voltage, and form. The type of electrical disturbance in one or more regions of the brain reveals the location and the nature of the abnormality. There is no need to discuss the various types of abnormal activity in this research. It is enough to say here that from the standpoint of a cortical frequency spectrum, the following relationships hold. Fast frequencies are associated with grand mal epilepsy and states of confusion such as may be found in light ether and light alcohol. Slightly increased frequencies are associated with attention and fright. Slower frequencies are found in infants, deteriorated epileptics, and are associated with conditions of sleep, petit mal epilepsy, stupor, surgical anesthesia, and brain pathology.

In general, an increase in the size of the waves is found in conditions of reduced consciousness, such as sleep, stupor, epileptic seizures, and surgical anesthesia. This relationship between size of wave and degree of conscious awareness is so close that any slowing up of the rhythms is indicative of a corresponding reduction in consciousness.

For the purposes of the present investigation, several additional criteria have been used to determine the degree and nature of possible abnormality. The alpha index is one of these. It is the percentage of time the alpha rhythm appears in any given brain area under consideration. On the basis of the alpha index, normal subjects have been divided into groups by Davis and Davis.³ These authors also measured the alpha index on a hundred mental hospital patients. In this abnormal series of subjects, the peak in the distribution was toward the lower indices.

Another additional criterion is the similarity at any given moment of alpha patterns from area to area. This similarity shows the degree to which the brain discharges as a whole, or under a single dominant rhythm. Inversely it shows the degree of influence from focalized points of heightened cortical activity. That is, the more similarity from area to area, the less specific is this cortical activity. This criterion was adopted to throw light on the specificity of cerebral integration in speaking and stuttering.

II. ELECTROENCEPHALOGRAPHY APPLIED TO STUTTERING

There have been three published and three unpublished investigations of the alpha characteristics of stutterers. The first of these

³ Davis, H., and Davis, P., "Action Potentials of the Brain of Normal Persons and in Normal States of Cerebral Activity," *Arch. Neurol. and Psychiat.*, XXXVI (1936), 1214-1224.

was reported in 1936 by Travis and Knott.⁴ They recorded the brain potentials from nineteen normal speakers and seventeen stutterers during periods of speech and silence. They used bipolar leads to record the potentials between the visual and motor regions of the left hemisphere. Random samplings of ten waves each were read for mean amplitude in microvolts and mean per cent time alpha duration for periods of silence and speech. All alpha waves were read for amplitude and duration in the interval of time marked stuttering.

Analyzing their data quantitatively, significant differences in amplitude were found for:

A. Stutterers

1. Larger waves during stuttering speech than non-stuttering speech
2. Larger waves during stuttering speech than silence

B. Stutterers versus normals

1. Larger waves during stuttering speech than speech of normals
2. Larger waves for non-stuttering speech of stutterers than for speech of normals (a critical ratio of 2.3)

Significant differences in mean per cent time alpha duration were found for:

A. Stutterers

1. Slower waves for non-stuttering speech than stuttering speech

B. Stutterers versus normals

1. Slower waves for non-stuttering speech of stutterers than for speech of normals

C. Normals

1. Slower waves for silence than for speech

From these data, the authors concluded that "... within the limits of this study, we are not able to account for the possible psychological and neurological factors underlying the statistically significant differences found between normal speakers and stutterers."⁵

⁴ Travis, L. E., and Knott, J. R., "Brain Potentials from Normal Speakers and Stutterers," *Journal of Psychology*, II (1936), 137-150.

⁵ *Ibid.*, p. 150.

In 1937, the same authors⁶ reported a bilateral study of synchronization and isomorphism between the alpha brain potentials of seventeen stutterers and fifteen normal speakers. Bipolar leads recorded the potentials from the motor and visual regions of each hemisphere. Isomorphism was defined in terms of wave pattern similarity. Synchrony was defined in terms of phase relationships.

Their data in negative terms were quantitatively stated in these percentages:

A. Time out of phase and dissimilarity for stutterers

1. Silence

- a. dissimilarity 15.1%
- b. out of phase 5.0%

2. Stuttering speech

- a. dissimilarity 2.6%
- b. out of phase 3.9%

3. Non-stuttering speech

- a. dissimilarity 3.4%
- b. out of phase 1.9%

B. Time out of phase and dissimilarity for normals

1. Silence

- a. dissimilarity 6.6%
- b. out of phase 5.5%

2. Speech

- a. dissimilarity 8.5%
- b. out of phase 7.7%

Using a CR of 2.8 as being significant, the following comparisons were deemed to be of statistical importance:

A. Stutterers for similarity

- 1. Potentials during non-stuttering speech were less dissimilar than during silence
- 2. Potentials during stuttering speech were less dissimilar than during silence

B. Stutterers versus normals for similarity

- 1. Potentials during silence of stutterers showed more dissimilarity than normals

⁶ Travis, L. E., and Knott, J. R., "Bilaterally Recorded Brain Potentials from Normal Speakers and Stutterers," *Journal of Speech Disorders*, II (1937), 239-241.

C. Stutterers versus normals for phase relationships

1. Potentials during non-stuttering speech of stutterers showed less out-of-phase relationships than during speech of normals

In general, the data indicate that during speech stutterers have not as wide a hemispheric difference in the similarity of brain potentials as normals, with a reversed ratio during silence. During speech, stutterers also showed more in-phase relationships between the two hemispheres than normals.

To test the assumption that the stutterers were functioning on a dangerously close level of hemispheric differences, the severity of stuttering, as indicated from the signal records on the data, was correlated (rank order) with the amount of dissimilarity and out-of-phasesness of brain potentials. The results were:

A. Stuttering versus similarity

1. The greater the severity of stuttering, the less dissimilar were the potentials from the two hemispheres during silence (ρ equals $-.66$)
2. The greater the severity of stuttering, the less dissimilarity during non-stuttering speech (ρ equals $-.34$)
3. The greater the severity of stuttering, the more dissimilarity during stuttering speech (ρ equals $.20$)

B. Stuttering versus out-of-phasesness

1. The greater the severity of stuttering, the more out-of-phasesness during silence (ρ equals $.32$)
2. The greater the severity of stuttering the more out-of-phasesness during stuttering speech (ρ equals $.53$)
3. No relation between severity of stuttering and out-of-phasesness during non-stuttering speech (ρ equals $-.09$)

According to the authors, the apparent contradictions from the above correlations raised more questions than the study answered. Stutterers had less out-of-phasesness during normal speech than normals, but the less out-of-phasesness of a stutterer's bilateral potentials, the *less* severe was his stuttering.

The third published study on this subject was by Lindsley.⁷ Using bipolar leads, he compared the alpha synchrony and pattern similarity of the two cerebral hemispheres with handedness indices.

⁷ Lindsley, D. B., "Bilateral Differences in Brain Potentials from Two Cerebral Hemispheres in Relation to Laterality and Stuttering," *Journal of Experimental Psychology*, XXVI (1940), 211-225.

The pattern similarity was described in terms of unilateral blocking. Electroencephalographic and handedness records were taken from two adult stutterers and sixty-five normal speaking children. His findings may be summarized in terms of the two relationships under consideration, i.e., synchronism and unilateral blocking.

A. Asynchronism (stated negatively) or out-of-phasesness of alpha waves

1. More asynchronism in people with mixed laterality (occipital area)
2. Asynchronisms similar to mixed laterality group (occipital area) in two stutterers
3. Consistent asynchronism in both occipital and motor areas with stuttering, but no significant changes from silence to speech
4. Asynchronism just before stuttering spasm in occipital and motor areas

B. Unilateral blocking of alpha waves

1. More unilateral blocking in those individuals lacking laterality
2. More unilateral blocking during stuttering and during normal speech than during silence and confined mostly to one hemisphere
3. More unilateral blocking for right handed subjects in the left hemisphere and vice versa for left handed subjects. Not at the significant level.
4. More blocking in one hemisphere than in another, but with slight relation to laterality
5. Less unilateral blocking for right handed than left handed subjects
6. Frequent periods of unilateral blocking just before stuttering spasm

Lindsley summarized his data by saying

. . . that practically all of the signalled or recorded stuttering episodes in which a blocking of speech was involved were accompanied by unilateral blocking (sometimes bilateral blocking) or phase reversals of the alpha rhythm in the occipital and motor speech regions . . . [and] if one considers that the successive peaks and troughs of alpha waves from a particular region of the cortex represent alterations in the excitatory state of the cortex or its susceptibility to excitation . . . then the asynchronism of the alpha waves in bilaterally homologous regions of the cortex implies that impulses cannot arise simultaneously in these regions. This would also apply

to the regions of the cortex (visual and auditory) involved in preliminary states of organization of speech patterns as well as to the motor speech areas, for such patterns must be transmitted to the final common outlet in the motor speech areas.⁸

Some writers suggest that differences in phase relationships may be due to the bipolar method of recording, which would be susceptible to changes in foci of the alpha rhythm. However, this does not explain the asynchronism differences between Lindsley's results and those of Travis and Knott.

In an unpublished study, Scarbrough,⁹ using twenty right handed stutterers and twenty right handed normal subjects, recorded, for silent periods only, simultaneous electroencephalograms (with monopolar leads) from the frontal, motor and occipital areas of the left hemisphere. Two records were taken with an interval of one week elapsing between the recordings. Samples from both records were read, the samples coming at the beginning and at the end of fifteen minute recordings. Examination of the records revealed that there were no significant differences for:

A. Stutterers versus normals

1. Mean number of waves per second from the three recorded areas or from any of the samplings of these areas
2. Mean variabilities of the mean number of waves per second from the three recorded areas or from any of the samplings of these areas

In another unpublished study, Douglass¹⁰ found no significant differences for the measures of per cent time alpha blocking between normals and stutterers during silence. He recorded by monopolar leads the occipital and motor areas of each hemisphere during speech and silence under suitable experimental conditions. The electroencephalograms were taken from twenty stutterers and twenty normal speakers. The records were examined for per cent time alpha, for bilateral and unilateral blocking and for variability of the above relations for stutterers and normal speakers.

⁸ *Ibid.*, pp. 222-224.

⁹ Scarbrough, H. E., "A Quantitative and Qualitative Analysis of the Electroencephalogram of Stutterers and Non-stutterers," Ph.D. Dissertation, State University of Iowa, 1939.

¹⁰ Douglass, L. C., "A Study of Bilaterally Recorded Electroencephalograms of Adult Stutterers," Ph.D. Dissertation, State University of Iowa, 1940.

The results of this experiment were found to be statistically significant for:

- A. Stutterers versus normals in left and right occipital areas
 - 1. Lower per cent time alpha for stutterers' non-stuttering speech than speech for normals
 - 2. Lower per cent time alpha for stutterers' stuttering speech than speech for normals
- B. Stutterers versus normals in left motor area
 - 1. Lower per cent time alpha for stutterers in non-stuttering speech than for speech of normals
- C. Stutterers versus normals for bilateral blocking, left and right occipital areas
 - 1. Higher per cent time alpha blocking for stutterers in both stuttering and non-stuttering speech than normals during speech
- D. Stutterers versus normals, variability of bilateral per cent time alpha blocked for left and right occipital areas
 - 1. Stutterers more variable in stuttering and non-stuttering speech than normals during speech
- E. Stutterers versus normals, variability of unilateral per cent time alpha blocked, right motor area
 - 1. Stutterers more variable in non-stuttering speech than normals during speech
- F. Stutterers versus normals, left occipital minus right occipital area
 - 1. More left hemisphere blocking for stutterers and more right hemisphere blocking for normals during silence. This significance was lost during speech.
- G. Stutterers versus normals, per cent time alpha variability of left motor area minus right motor area
 - 1. Greater in normals' silence than stutterers' silence
 - 2. Greater in stutterers' non-stuttering speech than in speech for normals
- H. Stutterers, the four areas recorded for per cent time alpha
 - 1. More alpha in silence than in stuttering and non-stuttering speech
- I. Stutterers, per cent time bilateral alpha blocking for left and right occipital areas
 - 1. More blocking in stuttering and non-stuttering than in silence

- J. Stutterers, unilateral blocking variability
 - 1. More variability during non-stuttering speech than silence for right motor area
 - 2. More variability in non-stuttering speech than in stuttering speech, for right motor area
- K. Stutterers, variability of per cent time alpha for left visual and motor areas minus right visual and motor areas respectively
 - 1. More variance for non-stuttering speech than for silence
 - 2. More variance for stuttering speech than for silence

By the alpha-wave criterion, this mass of data seems to indicate that stutterers are more sensitive during speech than normals. This was also true for stutterers as they progressed from silence to speech. On the whole, normals appeared to be more stable in respect to the variability of the alpha criterion. These differences

... may be attributed to a greater "attention" value of speech for stutterers than for normals. This hypothesis is put forth as being more acceptable than one postulating a basic physiological [neurological?] difference between stutterers and non-stutterers in this respect.¹¹

But it would seem important to inquire if end results of "attentional values" are not in some way dependent upon the condition of neural states at the time of stimuli impingement. Unless one can separate mind from body, the Douglass hypothesis has little significance.

The only other electroencephalographic study with stutterers was reported by Douglass¹² from an unpublished Master's thesis of Hamstra at the University of Iowa. Hamstra analyzed his results from monopolar leads in the left occipital and motor areas (and a left motor bipolar lead) into terms of mean number of waves per second for twelve stutterers. This mean was calculated for eyes closed, eyes opened and reading. His results were:

- A. Stutterers
 - 1. An increase in mean number of waves per second in reading when compared with silence
 - 2. The variability in mean number of waves significantly greater during stuttering than during non-stuttering reading

In general, electroencephalographic studies on stutterers offer no systematic agreement, and none of the studies approached similarity in all the experimental conditions. The trend indicates that there are

¹¹ *Ibid.*, p. 55.

¹² *Ibid.*

some significant differences in several relationships between stutterers and normal speakers. There seemed to be no agreement for the causes of these differences.

III. THE PROBLEM

Except for such visceral structures as the liver and heart, the human body is repeated and reversed symmetrically, i.e., one side of the human organism is the mirrored counterpart of the other. Travis¹³ has posited such an anti-tropic theory for function as well as for physiological structures. During the speech of the normal speaker, the peripheral speech mechanism is seen to function with highly coordinated endeavor. During stuttering, this highly coordinated activity is lacking. From the speech laboratories of the University of Iowa, under the direction of Travis, have come studies¹⁴ showing the non-rhythmical character of the innervation of the peripheral speech structures of stutterers. These dyssynergies have been interpreted as resulting from the lack of cortical control of a dominant hemisphere. It is concluded that

. . . stuttering may be . . . considered as a manifestation of an alteration in cortical activity and control. When this alteration leads to an absence of the speech dominant gradient of excitation of adequate potential, the outcome may be stuttering . . . Inasmuch as speech is one of the most highly differentiated activities of the human being, it demands the most in a dominant field. In stuttering I conclude that no such field exists.¹⁵

The problem of this study is to measure the cerebral activity of stutterers and normal speakers by means of the electroencephalograph. Inasmuch as the activity of a dominant speech gradient may or may not be detectable in one certain cerebral area, and that during speech activity, different cerebral areas may or may not be alterable in certain relationships to each other, it was deemed to be of importance to examine the important functional areas of the whole cortex for alpha activity. This has not been done in any previous study. The comparisons in previous studies were made from not more than four areas.

¹³ Travis, L. E., *Speech Pathology* (New York, 1931).

¹⁴ Morley, A., "An Analysis of Associative and Predisposing Factors in the Symptomatology of Stuttering," *Psychol. Monog.*, XLIX (1937), 50-107; Steer, M. C., "Symptomatology of Young Stutterers," *J. Sp. Disorders*, II (1937), 3-13; Strother, C., "A Study of the Extent of Dyssynergia Occurring During the Stuttering Spasm," *Psychol. Monog.*, XLIX (1937), 108-127.

¹⁵ Travis, L. E., *Speech Pathology* (New York, 1931), pp. 145-147.

It is assumed that alpha activity is the result of neural functioning, and that any alteration of this activity is to be viewed as revealing differences of neural functioning at the time of its occurrence.

Inasmuch as previous studies have dealt with only one or two aspects of cerebral activity, the search for differences was directed toward the comparison of the following relationships for normals, stutterers, and for normals versus stutterers during silence, speech, and stuttering speech:

1. The mean per cent time alpha activity for designated areas
2. The mean per cent time alpha similarity for designated areas
3. The mean amplitude in microvolts for designated areas
4. The mean amplitude range in microvolts for designated areas

IV. APPARATUS AND PROCEDURE

A three channelled, Grass electroencephalograph was used to record the brain potentials. Thus, the activity of three areas was recorded simultaneously. The filters for the power amplifiers were set at M-2 and the attenuators at 5 and 100, the adjustments suggested by Grass for electroencephalograms.

Twenty normal speakers and twenty stutterers,¹⁶ chosen without regard for handedness,¹⁷ served as subjects. Eight electrodes were placed on the head as follows:

1. Left and right frontal areas, 1-6, approximately an inch and a half above the outside corner of each eye
2. Left and right lower motor areas, 2-5, approximately two inches above the center of the helix
3. Left and right occipital areas, 3-4, approximately two inches above the inion and an inch and a half on a horizontal plane from the first location
4. Left and right upper motor areas, 7-8, approximately an inch from the mid-line and an inch and a half forward from a line drawn across the head directly from the center of the two helices

¹⁶ Normals' mean age was twenty-two years and one month with a range of thirteen to forty-two years. Stutterers' mean age was twenty-five years and three months, with a range of thirteen to forty-seven years.

¹⁷ According to behavioral indices, there were three left-handed normals and two left-handed stutterers.

A surface electrode placement was made by means of a specially designed head band. The hair was cut from the place where electrode contact was to be made. This place was then cleaned by acetone. Good electrode contact was secured by the use of a commercial saline paste. A contact resistance above ten thousand ohms was considered too high for experimental purposes.

The subjects were told to relax and keep the eyes closed for all parts of the experiment. Records were taken during silence, speech, and, in the case of stutterers, stuttering speech. Stuttering speech was indicated on the record by the use of an electrical signal marker.

Except during stuttering, thirty seconds of continuous brain wave activity were examined for (1) mean per cent time alpha activity, (2) mean amplitude in microvolts, (3) mean range in microvolts, and (4) the mean per cent time alpha similarity. The stutterers' speech was measured in consecutive units as they appeared on the records.

The above measurements were made by the use of a transparent millimeter ruler. Isolated alpha waves were not considered. There had to be at least four consecutive alpha waves of ten microvolts in amplitude before the criterion of alpha patterning was met. The frequency range for the alpha activity was arbitrarily set between eight and thirteen pulsations per second.

In six trials, the following ipsilateral, contralateral homologous and heterologous, and horizontal brain areas were recorded simultaneously:

- Trial 1—areas 6-5, 1-2, 2-3
- Trial 2—areas 2-3, 4-5, 5-6
- Trial 3—areas 1-3, 6-4, 7-8
- Trial 4—areas 2-7, 5-8, 1-6
- Trial 5—areas 1-6, 2-5, 3-4
- Trial 6—areas 3-7, 4-8, 3-4

In order to reveal exactly what was done, a tabulation of the work for Trial 1 is presented.

A. Normals, area for area

- 1. 6-5 of silence versus 6-5 of speech
- 2. 1-2 of silence versus 1-2 of speech
- 3. 2-3 of silence versus 2-3 of speech

B. Stutterers, area for area

- 1. 6-5 of silence versus 6-5 of normal speech
- 2. 6-5 of silence versus 6-5 of stuttering speech

3. 6-5 of normal speech versus 6-5 of stuttering speech
 4. 1-2 of silence versus 1-2 of normal speech
 5. 1-2 of silence versus 1-2 of stuttering speech
 6. 1-2 of normal speech versus 1-2 of stuttering speech
 7. 2-3 of silence versus 2-3 of normal speech
 8. 2-3 of silence versus 2-3 of stuttering speech
 9. 2-3 of normal speech versus 2-3 of stuttering speech
- C. Normals versus stutterers, area for area
1. 6-5 of silence for normals versus 6-5 of silence for stutterers
 2. 6-5 of speech for normals versus 6-5 of normal speech for stutterers
 3. 6-5 of speech for normals versus 6-5 of stuttering speech for stutterers
 4. 6-5 of silence for normals versus 6-5 of stuttering speech for stutterers
 5. 6-5 of silence for normals versus 6-5 of normal speech for stutterers
 6. 1-2 of silence for normals versus 1-2 of silence for stutterers
 7. 1-2 of speech for normals versus 1-2 of normal speech for stutterers
 8. 1-2 of speech for normals versus 1-2 of stuttering speech for stutterers
 9. 1-2 of silence for normals versus 1-2 of stuttering speech for stutterers
 10. 1-2 of silence for normals versus 1-2 of normal speech for stutterers
 11. 2-3 of silence for normals versus 2-3 of silence for stutterers
 12. 2-3 of speech for normals versus 2-3 of normal speech for stutterers
 13. 2-3 of speech for normals versus 2-3 of stuttering speech for stutterers
 14. 2-3 of silence for normals versus 2-3 of stuttering speech for stutterers
 15. 2-3 of silence for normals versus 2-3 of normal speech for stutterers
- D. Normals, area against area
1. 6-5 of silence versus 1-2 of silence
 2. 6-5 of speech versus 1-2 of speech

3. 1-2 of silence versus 2-3 of silence
 4. 1-2 of speech versus 2-3 of speech
 5. 2-3 of silence versus 6-5 of silence
 6. 2-3 of speech versus 6-5 of speech
- E. Stutterers, area against area
1. 6-5 of silence versus 1-2 of silence
 2. 6-5 of speech versus 1-2 of speech
 3. 6-5 of stuttering versus 1-2 of stuttering
 4. 1-2 of silence versus 2-3 of silence
 5. 1-2 of speech versus 2-3 of speech
 6. 1-2 of stuttering versus 2-3 of stuttering
 7. 2-3 of silence versus 6-5 of silence
 8. 2-3 of speech versus 6-5 of speech
 9. 2-3 of stuttering versus 6-5 of stuttering

Hereafter, area for area and area against area comparisons will refer to the above procedures. When the above comparisons were made for the six trials and the four measurements of this research, it was necessary to obtain 480 separate means, standard deviations, and standard errors. In search of cortical differences, 1008 comparisons and CR's were made, with the significant level of CR placed at 2.7. The comparison of statistically significant and non-significant CR's for normals and stutterers made an additional sixty comparisons.

V. RESULTS

The significant statistical data are presented in Tables V and VI. The following comparisons have a CR of 2.7 or above:

- A. Normals, area for area (for example, 6-5 silence versus 6-5 speech)
1. More per cent time alpha activity during silence than speech for
 - a. the left frontal, 1-2
 - b. the lower motor, 2-5
 2. More per cent time alpha similarity during silence than speech for
 - a. the left visual, 2-3, and right frontal, 5-6
 - b. the right hemisphere, 6-4, and upper motor, 7-8
 - c. the lower motor, 2-5, and visual, 3-4

- B. Stutterers, area for area
 - 1. No significant differences for any of the measures
- C. Normals versus stutterers, area for area
 - 1. No significant differences for any of the measures
- D. Normals, area against area (for example, 6-5 silence versus 1-2 silence)
 - 1. More per cent time alpha activity, more amplitude and range amplitude for silence and speech for
 - a. left visual, 2-3, than for left frontal, 1-2
 - b. left visual, 2-3, than for right frontal, 5-6,¹⁸ though not consistent with another sampling
 - c. left hemisphere, 1-3, than for upper motor, 7-8
 - 2. More per cent time alpha during silence and speech for
 - a. right visual, 4-5, than for right frontal, 6-5
 - b. left motor, 2-7, than for frontal, 1-6
 - c. right motor, 5-8, than for frontal, 1-6
 - d. lower motor, 2-5, than for frontal, 1-6
 - e. visual, 3-4, than for frontal, 1-6
 - f. visual, 3-4, than for lower motor, 2-5
 - 3. More per cent time alpha similarity during silence and speech for
 - a. left visual, 2-3, and right visual, 4-5, against
 - (1). right visual, 4-5, and right frontal, 5-6
 - (2). right frontal, 5-6, and left visual, 2-3
 - b. left hemisphere, 1-3, and right hemisphere, 6-4, against
 - (1). right hemisphere, 6-4, and upper motor, 7-8
 - (2). left hemisphere, 1-3, and upper motor, 7-8
 - c. left motor, 2-7, and right motor, 5-8, against
 - (1). right motor, 5-8, and frontal, 1-6
 - (2). left motor, 2-7, and frontal, 1-6
 - d. lower motor, 2-5, and visual, 3-4, against
 - (1). lower motor, 2-5, and frontal, 1-6
 - (2). visual, 3-4, and frontal, 1-6
 - 4. More range amplitude during silence for
 - a. right visual, 4-5, than for right frontal, 6-5
 - b. lower motor, 2-5, than for frontal, 1-6
 - c. visual, 3-4, than for frontal, 1-6

¹⁸ The comparison of alpha activity for areas 1-2 and 4-5, though not run simultaneously, gave significant differences large enough to assume the same relationship would hold in the various conditions as for 2-3 and 6-5. This was also true for stutterers, but with a lower significant CR.

E. Stutterers, area against area

1. More per cent time alpha, more amplitude and range amplitude during silence, speech and stuttering speech for
 - a. left visual, 2-3, than for left frontal, 1-2
 - b. left visual, 2-3, than for right frontal, 6-5, though not consistent with another sampling (not during stutterers' normal speech for range amplitude)
 - c. left hemisphere, 1-3, than for upper motor, 7-8
 - d. right hemisphere, 6-4, than for upper motor, 7-8
 - e. lower motor, 2-5, than for frontal, 1-6
 - f. visual, 3-4, than for frontal, 1-6, but not during stutterers' normal speech for amplitude
 - g. visual, 3-4, than for lower motor, 2-5, but not during stutterers' silence and normal speech for amplitude and range amplitude
2. More per cent time alpha during silence, speech and stuttering speech for
 - a. right visual, 4-5, than for right frontal, 5-6
 - b. left motor, 2-7, than for frontal, 1-6
 - c. right motor, 5-8, than for frontal, 1-6
3. More per cent time alpha similarity during silence, speech and stuttering speech for
 - a. left visual, 2-3, and right visual, 4-5, against
 - (1). right visual, 4-5, and right frontal, 5-6, but not for silence
 - (2). left visual, 2-3, and right frontal, 5-6, but not for silence
 - b. left hemisphere, 1-3, and right hemisphere, 6-4, against
 - (1). right hemisphere, 6-4, and upper motor, 7-8
 - (2). left hemisphere, 1-3, and upper motor, 7-8
 - c. visual, 3-4, and lower motor, 2-5, against
 - (1). lower motor, 2-5, and frontal, 1-6
 - (2). visual, 3-4, and frontal, 1-6
 - d. left motor, 2-7, and right motor, 5-8, against
 - (1). right motor, 5-8, and frontal, 1-6
 - (2). left motor, 2-7, and frontal, 1-6, for stutterers' normal speech only

In order to show trend differences (a CR between 2.0 and 2.7 was considered a trend) as well as significant differences, the following comparisons of CR's have been made:

A. Differences in per cent time alpha for normals and stutterers

1. Area for area

a. more for normals from silence to speech for

(1). left frontal, 1-2

(a). CR for normals, 2.9; CR for stutterers below 2.0

(2). left visual, 2-3

(a). CR for normals, 2.1; CR for stutterers below 2.0

(3). left and right hemispheres, 1-3, 6-4

(a). CR for normals, 2.3 in both instances; CR for stutterers below 2.0 in both instances

(4). right motor, 5-8

(a). CR for normals, 2.3; CR for stutterers below 2.0

(5). left visual upper motor, 3-7

(a). CR for normals, 2.1; CR for stutterers below 2.0

(6). lower motor, 2-5

(a). CR for normals, 2.8; CR for stutterers below 2.0

2. Area against area

a. more for normals during silence for

(1). left visual, 2-3, against right frontal, 5-6

(a). CR for normals, 5.5; CR for stutterers 2.5

B. Amplitude differences for normals and stutterers

1. Area for area

a. more for normals from silence to speech for

(1). upper motor, 7-8, though reversed in favor of speech

(a). CR for normals, 2.0; CR for stutterers below 2.0

2. Area against area

a. more for normals during silence and speech for

(1). left visual, 2-3, against right frontal, 6-5 (one sampling)

(a). silence: CR for normals 3.1; CR for stutterers below 2.0

(b). normal speech: CR for normals 2.7; CR for stutterers below 2.0

b. more for stutterers during silence, normal speech and stuttering speech for

- (1). visual, 3-4, against frontal, 1-6
 - (a). silence: CR for stutterers 4.8; CR for normals 2.3
 - (b). speech: CR for stutterers 2.5; CR for normals below 2.0
 - (c). stuttering: CR for stutterers 2.9; CR for normals' speech below 2.0
- (2). visual, 3-4, against lower motor, 2-5
 - (a). silence: CR for stutterers 2.4; CR for normals below 2.0
 - (b). speech: CR for stutterers 2.4; CR for normals below 2.0
 - (c). stuttering: CR for stutterers 2.9; CR for normals' speech below 2.0
- (3). lower motor, 2-5, against frontal, 1-6
 - (a). silence: CR for stutterers 3.3; CR for normals below 2.0
 - (b). speech: CR for stutterers 2.8; CR for normals below 2.0
 - (c). stuttering: CR for stutterers 3.6; CR for normals' speech below 2.0

c. more for stutterers' stuttering speech than for stutterers' normal speech for

- (1). visual, 3-4, against frontal, 1-6
 - (a). CR for stuttering 2.9; CR for normal speech 2.5
- (2). lower motor, 2-5, against frontal, 1-6
 - (a). CR for stuttering 3.6; CR for normal speech 2.8 (above set level of 2.7, but below 3.0)

d. more for stutterers' stuttering speech than for stutterers' normal speech and silence for

- (1). visual, 3-4, against lower motor, 2-5
 - (a). CR for stuttering 2.9; CR for silence and normal speech 2.4

C. Range amplitude differences for normals and stutterers

1. Area for area

- a. more for stutterers during silence for
 - (1). upper motor, 7-8
 - (a). CR of 2.0, normals versus stutterers
- b. more for normals during silence for
 - (1). lower motor, 2-5
 - (a). CR of 2.6, normals versus stutterers

2. Area against area

- a. more for normals during silence and speech for
 - (1). left visual, 2-3, against right frontal, 5-6
 - (a). speech: CR for normals 2.8; CR for stutterers' normal speech 2.5
 - (b). another speech sampling: CR for normals 2.0; CR for stutterers' normal speech below 2.0
 - (c). silence for one sampling: CR for normals 3.2; CR for stutterers below 2.0
- b. more for stutterers during silence for
 - (1). left motor, 2-7, against frontal, 1-6
 - (a). CR for stutterers 2.3; CR for normals below 2.0
- c. more for stutterers during normal speech and stuttering speech than during normals' speech for
 - (1). lower motor, 2-5, against frontal, 1-6
 - (a). speech: CR for stutterers 3.2; CR for normals 2.1
 - (b). stuttering: CR for stutterers 4.0; CR for normals' speech 2.1
 - (2). visual, 3-4, against frontal, 1-6
 - (a). speech: CR for stutterers 5.0; CR for normals 2.6
 - (b). stuttering: CR for stutterers 6.2; CR for normals' speech 2.6
- d. more for stutterers' stuttering speech than for stutterers' silence and normal speech for
 - (1). visual, 3-4, against lower motor, 2-5
 - (a). CR for stuttering 2.9; CR for silence 2.2 and CR for normal speech 2.1

e. more for normals during silence and speech against stutterers' stuttering speech

(1). right visual, 4-5, against right frontal, 5-6

(a). silence: CR for normals 3.0; CR for stutterers below 2.0

(b). speech: CR for normals 2.3; CR for stutterers' stuttering speech below 2.0

f. more for stutterers during silence, normal speech and stuttering speech than for normals during silence and speech

(1). visual, 3-4, against lower motor, 2-5

(a). silence: CR for stutterers 2.2; CR for normals below 2.0

(b). normal speech: CR for stutterers 2.1; CR for normals below 2.0

(c). stuttering: CR for stutterers 2.9; CR for normals' speech below 2.0

D. Similarity differences for normals and stutterers

1. Area for area

a. more for normals from silence to speech for

(1). right and left frontal, 6-5, 1-2

(a). CR for normals 2.1; CR for stutterers below 2.0

(2). left visual and right frontal, 2-3, 6-5

(a). CR for normals 2.7; CR for stutterers 2.1

(3). right and left hemispheres, 6-4, 1-3

(a). CR for normals 2.2; CR for stutterers below 2.0

(4). lower motor and visual, 2-5, 3-4

(a). CR for normals 2.7; CR for stutterers below 2.0

(b). CR for normals versus stutterers 2.0

(5). right hemisphere and upper motor, 6-4, 7-8

(a). CR for normals 2.9; CR for stutterers below 2.0

b. more for normals during speech than stutterers during stuttering speech for

(1). frontal and visual, 1-6, 3-4

(a). CR of 2.3 for normals versus stutterers

c. more for stutterers during stuttering speech than silence of stutterers (lost for stuttering against normal speech) for

(1). right visual and right frontal, 4-5, 5-6

(a). CR of 2.4

(b). the same areas from silence to speech favored normals by a CR of 2.6 to 2.2

(2). left visual and right frontal, 2-3, 5-6

(a). a CR of 2.3

2. Area against area

a. more for normals during silence for

(1). left and right visual, 2-3, 4-5, against right visual and right frontal 4-5, 5-6

(a). CR for normals 4.4; CR for stutterers 2.1

(2). left and right visual 2-3, 4-5, against left visual and right frontal 2-3, 5-6

(a). CR for normals 4.5; CR for stutterers 2.0

b. more for normals during silence and speech than for stutterers during silence and stuttering speech for

(1). left and right motor, 2-7, 5-8, against right motor and frontal, 5-8, 1-6

(a). silence: CR for normals 4.1; CR for stutterers 2.5

(b). speech: CR for normals 3.6; CR for stutterers' stuttering speech 2.0 (normal speech 2.7)

(2). left and right motor, 2-7, 5-8, against left motor and frontal, 2-7, 1-6

(a). silence: CR for normals 4.6; CR for stutterers 2.6

(b). speech: CR for normals 3.6; CR for stutterers' stuttering speech 2.0 (normal speech 2.8)

c. more for stutterers during normal speech than during silence and stuttering speech for

(1). left and right motor, 2-7, 5-8, against left motor and frontal, 2-7, 1-6

(a). normal speech: CR of 2.8; silence: CR of 2.6; stuttering: CR of 2.0

- (2). left and right motor, 2-7, 5-8, against right motor and frontal, 5-8, 1-6
 - (a). normal speech: CR of 2.7; silence: CR of 2.5; stuttering: CR of 2.0
- d. more for stutterers during normal speech and stuttering speech than during silence (lost for stuttering against normal speech) for
 - (1). left and right visual 2-3, 4-5, against right visual and frontal, 4-5, 5-6
 - (a). silence: CR of 2.1; normal speech: CR of 3.2; stuttering: CR of 3.0
 - (2). left and right visual 2-3, 4-5, against left visual and right frontal, 2-3, 5-6
 - (a). silence: CR of 2.0; normal speech: CR of 3.3; stuttering: CR of 3.4

TABLE I
MEAN PER CENT TIME ALPHA

NORMALS												STUTTERS																	
Silence						Speech						Silence						Speech						Stuttering					
Area	Seconds	Number	Arith. Mean	Stand. Dev.	Stand. Error	Seconds	Number	Arith. Mean	Stand. Dev.	Stand. Error	Seconds	Number	Arith. Mean	Stand. Dev.	Stand. Error	Seconds	Number	Arith. Mean	Stand. Dev.	Stand. Error	Seconds	Number	Arith. Mean	Stand. Dev.	Stand. Error				
6-5	30	20	31.4	21.2	4.7	30	19	18.7	14.4	3.3	30	20	32.3	25.0	5.6	30	19	20.6	21.9	5.0	24.8	15	22.2	22.3	5.8				
1-2	30	20	28.3	21.9	4.6	30	19	14.0	16.3	3.7	30	20	32.0	24.8	5.5	30	19	19.5	23.4	5.4	24.8	15	20.3	18.2	4.7				
2-3	30	20	66.8	21.7	4.6	30	19	50.8	32.6	7.5	30	20	58.4	24.9	5.6	30	19	48.0	33.3	7.6	24.8	15	55.8	34.4	8.9				
2-3	30	20	67.1	23.7	5.3	30	19	49.3	28.1	6.5	30	20	60.0	32.6	7.3	29.3	20	51.6	33.0	7.4	27.5	16	56.7	34.5	8.6				
4-5	30	20	67.0	22.6	5.0	30	19	53.0	23.7	5.4	30	20	63.5	30.2	6.8	29.3	20	55.1	29.9	6.7	27.5	16	56.8	31.5	7.9				
5-6	30	20	28.0	21.0	4.7	30	19	16.6	11.0	2.5	30	20	36.0	28.3	6.3	29.3	20	19.4	23.8	5.4	27.5	16	17.6	20.6	5.1				
1-3	30	20	67.0	25.3	5.6	30	19	46.5	29.4	6.7	30	20	65.4	30.9	6.9	30	20	56.0	36.1	8.1	28.4	16	61.3	33.6	8.4				
6-4	30	20	68.0	25.3	5.6	30	19	48.4	27.0	6.3	30	20	67.1	30.2	6.8	30	20	56.1	34.4	7.2	28.4	16	61.6	34.2	8.5				
7-8	30	20	10.1	11.3	2.5	30	19	5.9	6.5	1.5	30	20	7.5	9.9	2.2	30	20	7.2	10.7	2.4	28.4	16	7.3	10.2	2.5				
2-7	30	20	27.8	17.6	3.9	30	19	18.8	15.9	3.6	30	20	29.9	24.6	5.5	29.4	20	21.6	21.2	4.7	27.3	16	20.2	19.8	4.9				
5-8	30	20	34.4	22.4	5.0	30	19	20.2	14.8	3.4	30	20	31.2	26.3	5.9	29.4	20	22.3	17.8	4.0	27.3	16	24.1	19.7	4.9				
1-6	30	20	4.2	4.6	1.0	30	19	2.7	4.0	.9	30	20	5.2	3.6	.8	29.4	20	3.7	2.0	.4	27.3	16	4.0	7.8	1.9				
1-6	30	20	3.5	3.3	.7	30	19	1.9	2.0	.4	30	20	5.4	6.5	1.4	29.5	20	2.1	3.3	.7	27.1	16	3.8	4.4	1.1				
2-5	30	20	39.6	19.6	4.4	30	19	24.5	13.6	3.1	30	20	34.5	23.0	5.1	29.5	20	25.0	19.2	4.3	27.1	16	28.8	20.2	5.0				
3-4	30	20	62.0	31.9	7.2	30	19	46.6	32.0	7.3	30	20	61.0	24.7	5.5	29.5	20	54.0	28.4	6.4	27.1	16	63.7	28.5	7.1				
3-7	29.7	18	71.9	20.0	4.7	28.3	18	54.6	29.8	7.0	30	20	62.2	32.1	7.2	30	20	54.8	34.4	7.7	28.5	16	61.5	35.2	8.8				
4-8	29.7	18	71.5	21.0	4.9	28.3	18	60.6	27.9	6.6	30	20	63.8	31.2	7.0	30	20	56.6	33.4	7.5	28.5	16	63.0	33.2	8.3				
3-4	29.7	18	61.9	22.8	5.4	28.3	18	53.8	27.0	6.4	30	20	59.6	27.6	5.9	30	20	54.7	30.2	6.8	28.5	16	60.6	28.1	7.0				

TABLE II
MEAN AMPLITUDE IN MICROVOLTS

[illegible]

TABLE IV
MEAN PER CENT TIME SIMILARITY

NORMALS										STUTTERS										
Silence					Speech					Silence					Speech					
Area	Seconds	Number	Arith. Mean	Stand. Dev.	Stand. Error	Seconds	Number	Arith. Mean	Stand. Dev.	Stand. Error	Seconds	Number	Arith. Mean	Stand. Dev.	Stand. Error	Seconds	Number	Arith. Mean	Stand. Dev.	Stand. Error
1-5, 1-2	30	20	17.0	17.9	4.0	30	19	7.6	9.2	2.1	30	20	20.3	20.4	4.6	30	19	11.2	18.8	4.3
1-2, 2-3	30	20	21.0	24.1	5.1	30	19	10.7	11.5	2.7	30	20	27.8	26.3	5.9	30	19	15.1	21.8	5.0
2-3, 6-5	30	20	26.6	21.2	4.5	30	19	12.1	13.3	3.0	30	20	27.3	25.6	5.7	30	19	13.5	19.8	4.5
2-3, 4-5	30	20	55.4	25.7	5.7	30	19	36.9	25.7	5.8	30	20	52.9	35.8	8.0	29.3	20	43.0	30.9	6.9
3-5, 5-6	30	20	24.1	19.4	4.3	30	19	11.9	8.6	2.0	30	20	31.3	27.2	6.1	29.3	20	15.6	20.4	4.6
4-6, 2-3	30	20	23.4	19.5	4.3	30	19	11.2	9.1	2.1	30	20	30.7	27.7	6.2	29.3	20	15.6	21.2	4.7
3-4, 6-4	30	20	58.0	29.6	6.5	30	19	37.4	28.3	6.5	30	20	58.6	33.0	6.4	30	20	48.7	33.3	7.5
4-7, 7-8	30	20	13.3	13.1	2.9	30	19	4.1	5.9	1.3	30	20	7.0	9.4	2.1	30	20	6.0	10.5	2.4
5-8, 1-3	30	20	8.2	10.3	2.3	30	19	3.4	5.4	1.2	30	20	6.5	9.9	2.2	30	20	6.2	10.6	2.5
2-7, 5-8	30	20	16.0	13.5	3.0	30	19	8.9	9.7	2.2	30	20	17.7	24.1	5.4	29.4	20	11.9	15.8	3.5
5-8, 1-6	30	20	2.8	3.7	.9	30	19	1.0	2.0	.4	30	20	3.6	6.2	1.4	29.4	20	2.2	4.2	.9
1-6, 2-7	30	20	2.2	2.7	.6	30	19	.9	2.5	.6	30	20	3.2	5.7	1.3	29.4	20	1.6	3.7	.8
1-6, 2-5	30	20	2.8	3.0	.7	30	19	1.6	1.8	.4	30	20	4.0	5.6	1.2	29.5	20	1.7	2.8	.6
2-5, 3-4	30	20	30.7	18.3	4.1	30	19	17.0	13.6	3.1	30	20	28.2	22.4	5.0	29.5	20	10.4	15.8	3.5
3-4, 1-6	30	20	2.9	3.0	.7	30	19	1.0	1.5	.3	30	20	4.8	5.9	1.3	29.5	20	1.7	3.2	.7
1-7, 4-8	29.7	18	60.3	26.8	6.3	28.3	18	47.5	30.5	7.3	30	20	54.9	34.5	7.7	30	20	47.2	32.1	7.2
2-8, 3-4	29.7	18	49.5	28.0	6.6	28.3	18	42.1	28.1	6.6	30	20	48.4	26.3	5.9	30	20	42.4	30.6	5.8
3-4, 3-7	29.7	18	50.3	28.5	6.7	28.3	18	37.7	29.9	7.0	30	20	46.9	31.5	7.1	30	20	40.0	30.6	5.8
																28.5	16	49.3	29.8	7.4
																28.5	16	55.0	33.9	8.5
																28.5	16	48.8	30.8	7.6
																28.5	16	49.3	29.8	7.4

TABLE V
CRITICAL RATIOS AT THE SIGNIFICANT LEVEL FOR THE VARIOUS
COMPARISONS FOR NORMALS*

PER CENT TIME ALPHA			MEAN AMPLITUDE			MEAN RANGE AMPLITUDE			PER CENT TIME ALPHA SIMILARITY		
Silence	Speech	Critical Ratio	Silence	Speech	Critical Ratio	Silence	Speech	Critical Ratio	Silence	Speech	Critical Ratio
Area for Area	1-2	2.9							2-3, 6-5 6-4, 7-8 2-5, 3-4	2-3, 6-5 6-4, 7-8 2-5, 3-4	2.7 2.9 2.7
2-5	2-5	2.8									
2-3, 2-1	2-3, 1-2	6.9	2-3, 1-2		6.1	2-3, 1-2		6.1			
2-3, 6-5	2-3, 6-5	4.5	2-3, 6-5		5.3	2-3, 6-5		3.9			
	2-3, 6-5	5.8			4.5			4.7			
4-5, 6-5	2-3, 6-5	3.9	2-3, 6-5		3.8	2-3, 6-5		2.8			
	4-5, 6-5	5.6			5.6	4-5, 6-5		3.0	2-3, 4-5-4-5, 6-5		4.4
2-3, 6-5	2-3, 6-5	6.2	2-3, 6-5		6.2	2-3, 6-5		3.2	2-3, 4-5-4-5, 6-5		4.0
	2-3, 6-5	5.5			5.5			3.2	2-3, 4-5-5-6, 2-3		4.5
1-3, 7-8	1-3, 7-8	4.7	1-3, 7-8		4.7	1-3, 7-8		9.6	1-3, 6-4-6-4, 7-8		4.2
6-4, 7-8	1-3, 7-8	9.2	6-4, 7-8		7.5	6-4, 7-8		6.2	1-3, 6-4-6-4, 7-8		6.3
	6-4, 7-8	5.8			8.8			10.8	1-3, 6-4-1-3, 7-8		5.3
	6-4, 7-8	6.0			9.0			8.5	1-3, 6-4-1-3, 7-8		7.2
2-7, 1-6	6-4, 7-8	6.5	6-4, 7-8		9.1				2-7, 5-8-5-8, 1-6		5.1
	2-7, 1-6	5.9			5.9				2-7, 5-8-5-8, 1-6		4.1
5-8, 1-6	2-7, 1-6	4.8			4.8				2-7, 5-8-2-7, 1-6		3.6
	5-8, 1-6	5.9			5.9				2-7, 5-8-2-7, 1-6		4.6
2-5, 1-6	5-8, 1-6	5.0			5.0				2-5, 3-4-1-6, 2-5		3.6
	2-5, 1-6	8.0			8.0				2-5, 3-4-1-6, 2-5		6.8
3-4, 1-6	2-5, 1-6	7.0			7.0				2-5, 3-4-1-6, 2-5		4.8
	3-4, 1-6	8.1			8.1				2-5, 3-4-1-6, 3-4		6.8
3-4, 2-5	3-4, 1-6	6.1			6.1				2-5, 3-4-1-6, 3-4		5.0
	3-4, 2-5	2.7			2.7						
	3-4, 2-5	2.8			2.8						

* The first area number is the larger unit of comparison.

DISCUSSION AND CONCLUSION

There has been some controversy concerning the two methods of brain potential recording, i.e., the monopolar and bipolar contacts. Many workers in the field favor the bipolar method, especially when the electrodes are separated by more than two millimeters. This preference for the bipolar method is especially pertinent when the "ground" of monopolar leads is placed above cortical tissue. The "ground" on cortical tissue causes considerable disturbance to the cerebral rhythms. For this reason many of the monopolar leads are now attached to the ear rather than to cortical tissue. This, it is argued, gives a better evaluation of the alpha rhythm in terms of phase for the individual waves.

Adrian and Yamagiwa¹⁹ have reported a shifting of alpha focus in various cortical areas, and it is this supposed shift of focus that causes the phase reversals found by Lindsley²⁰ and others who used the bipolar method of recording. That is, with bipolar contact, any change of focus would show up as a phase reversal on the recorded data. Just why these cortical phenomena in themselves are not important, is not made clear by Douglass²¹ and Scarbrough.²² Both suggested, however, that the two different methods of recording account for some of the conflicting data from electroencephalograms of stutterers. Because of the non-sensitiveness for shifting alpha locale due to proper "grounding," the monopolar method of electroencephalic research was implied to be superior to the bipolar method.

To test the assumption that the ear, as used by Douglass and Scarbrough, was a true "ground," a simultaneous recording was made for three areas: a bipolar contact for the left visual area, 2-3; a monopolar contact from the left occiput, 3, with "ground" to the left ear; and electrodes on the two ear lobes. The two ear lobe contacts gave waves of about nine per second. The bipolar and monopolar leads also gave alpha waves of approximately nine per second. The electrodes on the two ears actually measured the brain potentials from ear to ear since any two contacts on the human organism measure the potential between those two areas. This implies that there is no "ground" on human beings. In

¹⁹ Adrian, E. D., and Yamagiwa, K., "Origin of the Berger Rhythm," *Brain*, LVIII (1935), 323-351.

²⁰ *Op. cit.*

²¹ *Op. cit.*

²² *Op. cit.*

reality, "monopolar" recording is a bipolar procedure involving the potential between the two electrodes, including that portion which is not the brain. Thus, the so-called monopolar procedure used by Douglass and Scarbrough must be viewed basically as a poor bipolar method.

Most of the data of previous studies are not applicable to the present investigation, because this research did not measure the frequency and relationship of individual alpha waves. Only indirectly can bilateral and unilateral blocking reports be made comparable. On the basis of statistically significant differences, this research does not support any of the differences found *between* normals and stutterers of the previous investigations.

However, using the criterion of trends and using significant comparisons against non-significant comparisons, these data support Douglass' findings that more bilateral blocking occurred during normal speech than during silence for stutterers. In the present research, less per cent time alpha was found during normal speech than during silence for both groups of subjects. The two studies disagree on alpha activity for normals during silence to speech and for stutterers during normal speech to stuttering speech. The present research showed significant differences in both instances. However, *more* alpha activity was found for stuttering than for the stutterers' normal speech.

This research supports Lindsley's²³ findings that stutterers' normal speech, when compared to silence, acts as a depressant to the alpha rhythm. This suggests that the function of speech is a complex neurological process of heightened activity necessary for a high order of integration. Amplitude differences reported by Travis and Knott,²⁴ were corroborated in the exact relationships for stutterers, who were found to have larger waves during blocked speech than speech or silence. The differences between normals and stutterers were found to be in the brain areas from side to side, (1-6, 2-5, 3-4). Stutterers had the larger waves during silence, normal speech and stuttering speech.

In regard to similarity differences, there was full agreement with the reports of the above authors. In both instances, stutterers were found to be functioning with more alpha similarity between areas than normals, indicating a lack of heightened foci of cerebral activity.

²³ *Op. cit.*

²⁴ *Op. cit.*

Travis²⁵ has shown that heightened psychic activity alters the synchronization of the alpha rhythm. States of reduced consciousness are associated with an increase of the alpha rhythm.

On the basis of heightened cerebral activity, tabulation of differences from this research gives the following results:

- A. For mean per cent time alpha (criterion of foci of heightened cerebral activity)
 - 1. Eight comparisons favored normals
 - 2. No comparisons favored stuttering over the stutterers' silence and normal speech
 - 3. No comparisons favored the opposite points of view
- B. For mean amplitude (criterion of foci of heightened cerebral activity)
 - 1. Eleven comparisons favored normals
 - 2. Three comparisons favored stuttering over the stutterers' silence and normal speech
 - 3. One comparison incompatible with 1 and 2
- C. For mean range amplitude (criterion of foci of heightened cerebral activity)
 - 1. Fourteen comparisons favored normals
 - 2. Two comparisons favored stuttering over the stutterers' silence and normal speech
 - 3. One comparison incompatible with 1 and 2
- D. Mean per cent time alpha similarity (criterion of foci of heightened cerebral activity)
 - 1. Thirteen comparisons favored normals
 - 2. Two comparisons favored stuttering over the stutterers' normal speech and silence
 - 3. No comparisons favored the opposite points of view. There were six comparisons which showed more similarity for stutterers' silence over stuttering and normal speech. The significant comparison of stuttering against the stutterers' normal speech gave no trend difference.

A lumping of the above differences reveals that there were fifty-three differences, thirty-five of which were found to be significant. Also, thirteen of the fourteen brain areas studied in this research revealed differences in favor of the hypothesis that stutterers lack foci of heightened cerebral activity necessary for speech integration.

²⁵ Travis, L. E., "Brain Potentials and the Temporal Course of Consciousness," *J. of Exper. Psychol.*, XXI (1937), 302-309.

The evidence of this research reveals stutterers' brain potentials to be statistically different from normals' brain potentials for the following area comparisons:

1. Contralateral homologous (example, 1-2 versus 6-5)—two trend differences²⁶
2. Contralateral heterologous (example, 2-3 versus 6-5)—one trend and four significant differences
3. Ipsilateral (example, 4-5 versus 5-6)—one trend and one significant difference
4. Homologous (example, 1-2 silence versus 1-2 speech)—five trend and two significant differences
5. Side to side (example, 1-6 versus 2-5 versus 3-4)—eight trend and fourteen significant differences
6. Ipsilateral, contralateral homologous and heterologous (example, alpha similarity between 2-3, 4-5 versus 4-5, 5-6 versus 2-3, 5-6)—seven significant differences
7. One trend difference for range amplitude (2-7 versus 1-6) not included in above classification

This research also reveals that brain potentials during stuttering are statistically different from the brain potentials of the stutterers' normal speech and silence for the following area comparisons:

1. Side to side (example, 1-6 versus 2-5 versus 3-4)—five significant differences
2. Contralateral homologous (2-7, 5-8) versus 2-7, 1-6 and 5-8, 1-6—two significant differences

These data show that stutterers, when compared to normals, possess basic neurological differences which may have caused stuttering. These differences were found in nearly every conceivable brain area comparison. The significant data are so consistent in cortically differentiating stutterers from normals, that a conclusion is warranted.

Stutterers seemed to lack foci of heightened cerebral activity. There were forty-six differences which supported this hypothesis and two differences which did not. Stuttering speech, compared to the stutterers' normal speech and silence, also seemed to lack heightened attentional foci. There were seven differences in favor of this hypothesis and no differences against it.

The above differences represent a minority of the possible differences of this research. Thus, it is postulated that suitable psycho-

²⁶ CR between 2.0 and 2.7.

logical stimuli must be impinged upon certain basic neurological differences before stuttering may result. In other words, stutterers possess basic neurological differences which operate against speech integration. The electroencephalograms show that these differences are due to a lack of heightened foci of cerebral activity, a condition akin to reduced consciousness. Thus, the conclusion of this research is:

1. Stutterers are neurologically differentiated from normals.
2. The proper stimulation of the neurological differences forces stutterers to function in a relative state of reduced consciousness.
3. States of reduced consciousness, seen as a lack of heightened foci of cerebral activity, militate against the establishment of a dominant speech gradient.
4. The Travis hypothesis of a lack of speech gradients for stutterers is at least partially supported.

A STUDY OF THE EFFECT OF MUSCULAR EXERCISE UPON STUTTERING*

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FROM time to time writers in speech pathology have expressed the opinion, either by direct statement or by implication, that "fatigue" has an adverse effect on the speech of stutterers.¹ However, to the best of the writer's knowledge, this rather widely held opinion rests largely on clinical and everyday observation, and no direct experimental investigation of the problem has been made.

I. PROBLEM

As is well pointed out by Bills,² "fatigue," in common usage, is a term lacking precise definition and may refer to one or all of a number of physiological and psychological states, such as feelings of "weariness" or "exhaustion" or other subjective experiences and changes in cells and organs as a result of excessive functioning, and to certain directly observable phenomena, such as loss of efficiency in initiating and carrying out activity. Also it may appear as a result

*This study is the substantial equivalent of a Master's Thesis completed in 1940 at the State University of Iowa under the supervision of Dr. Wendell Johnson. The writer is indebted to him for suggestion of the problem and for guidance and help throughout the research.

¹ Bluemel, C. S., *Stammering and Allied Disorders* (New York, 1935), p. 156: "There is increase in stammering as a result of stimulation and fatigue. The child who is constantly overstimulated . . . will make little improvement in speech. This is also true of the child who is kept in a state of chronic fatigue by missing accustomed naps, by staying up late at night and by starting the day before the family." Van Riper, C., *Speech Correction* (New York, 1939), pp. 337-338: "A stutterer needs more rest than the average child . . . When the stuttering is at the height of a frequency wave, fatigue will greatly increase the actual number of blocks, and, when stuttering is at the bottom of that wave, fatigue will precipitate blocks which might otherwise not occur." Exhaustion, which implies fatigue, is listed as one of the important "precipitating factors" in stuttering by Travis, L. E., *Speech Pathology* (New York, 1931), p. 138. West, R., Kennedy, L., and Carr, A., *The Rehabilitation of Speech* (New York, 1937), p. 261: "His [the stutterer's] play activities should be moderate for he is likely to become overstimulated and easily fatigued. He should have daily rest periods to counteract fatigue and to offer additional opportunity for relaxation."

² Bills, A. G., "Fatigue in Mental Work." *Physiol. Rev.*, XVII (1937), p. 438.

of a variety of conditions, generally complex in nature. Statements regarding "fatigue" in the stuttering literature do not make clear which of the meanings of the term are intended, nor to what extent the physiological component is regarded as basic in producing the effects on stuttering which seem to be observed. However, since organic changes are an important part of the complex phenomenon called "fatigue," it might be inferred that such changes are considered to be of some functional importance. At least this inference is possible and is not expressly denied. Moreover, such an inference has theoretical importance concerning the extent to which physiological factors are of general causal significance in the phenomenon of stuttering.

This study was an attempt to obtain objective evidence, previously lacking, with regard to the effects of one type of fatiguing situation upon the speech fluency of stutterers, which would also bear directly upon this theoretical question as to the basic nature of physiological factors in the etiology of stuttering.

The reasoning process underlying this approach to the problem involves the following assumptions: (1) that muscular exercise is one factor in the complex of variables comprising many "fatiguing" situations; (2) that something which would be generally called "fatigue" typically results from muscular exercise of the severity used in the experiment; (3) that, if the exercise situation is relatively free from elements tending to produce excitement, heightened emotional tension, etc., the most important effects of the exercise will be those directly related to the physiological changes induced by the exercise, and (4) that careful observation of stutterers' speech following such exercise will provide data on the effects of such physiological changes on the speech of stutterers.

II. EXPERIMENTAL PROCEDURE

1. *Subjects and Experimental Design.* Twenty-one young adult male stutterers, 17-26 years of age, served as subjects. They were unselected except that all were receiving remedial speech instruction at the State University of Iowa, and all were required to have the University Student Health Service pass on their physical fitness to perform the rather strenuous exercise of the experiment.

The experiment consisted of three cycles, the first and third cycles being control conditions which were conducted one week prior to and one week following the experimental condition. In each the subjects read the same material, six five hundred-word passages of factual prose, the same order being used for a given subject on all

three cycles; the order was varied from subject to subject, however, three different orders of reading being used. The only difference between the control and experimental conditions was that during the experimental condition the subjects worked on an exercise apparatus for a period of fifteen minutes between the reading of each two passages, whereas, during the control conditions they rested or engaged in neutral activity for equivalent amounts of time.³ Thus the experimental condition consisted of five fifteen-minute periods of exercise interpolated between the readings of six prose passages, and the control conditions consisted of five equivalent periods of rest and neutral activity interpolated between readings of the same passages. All other conditions were held as constant as possible. With a few exceptions all three cycles were held at the same time of day. The subjects sat facing the experimenter at a distance of from ten to twelve feet, in such a way that they had adequate light by which to read, and so that their faces were clearly lighted for the experimenter. The experimenter was seated at a table on which was a key for recording observations of stuttering. No other person was in the room. The subjects were instructed to read in as natural a manner as possible, at about their normal rate and loudness, and to make no special effort to avoid blocks.

2. *Exercise Process.* The exercise process was one which has been extensively used in studies of the physiology of exercise⁴ and consisted of stepping on and off a step one-third of a meter (about thirteen inches) high. Each subject stepped at a rate of twenty-two steps per minute, in a standard manner, as follows. A metronome was set at a rate of eighty-eight beats per minute. The subjects made one complete step for each four beats of the metronome. At the count of one, the first foot was placed on the step; at the count of two, the second foot was brought up so that the subject was standing at his full height on the step; at three, the subject placed the first foot on the floor; at four the second foot was placed on the floor so that the subject was standing in front of the step in the original

³ The neutral activity consisted of attempting to piece together a puzzle picture, or playing solitaire.

⁴ Cf. Campbell, J. M. H., "The Pulse Rate After Exercise in Health and Disease," *Guy's Hosp. Reports*, LXXVII (1927), 184-215; Frey, H., "A Study of the Efficiency of College Women as Indicated by the Pulse-Ratio Test," M. A. Thesis, State University of Iowa, (1930); Hambley, W. D., Hunt, G. H., Parker, L. E. L., Pembrey, M. S., and Warner, E. G., "Tests for Physical Efficiency," Part II, *Guy's Hosp. Reports*, LXXII (1922), 367-385; and Hunter, J. G., "The Nature of the Response of the Heart to Stool-Stepping and Bicycle Riding," M. A. Thesis, State University of Iowa, (1939).

position. The subjects were allowed to change the foot which was placed on the step first as often as they desired so long as they did not break the rhythm of the stepping. Care was taken to see that the subjects came up to their full heights on the step each time, that they stepped down first with the same foot which had been first placed upon the step, and that they kept in time with the metronome throughout. The only rest allowed was two minutes after each work period in which the subject could catch his breath before he began to read, and the time actually consumed in reading the passages.

This task is a severe one. Each subject made a total of 1650 complete steps, each approximately thirteen inches in height, during seventy-five minutes of actual work, with only four short rest periods. Hambley, Hunt, Parker, Pembrey, and Warner⁵ found on the basis of the Pembrey Pulse-Ratio Test that such stepping is equivalent to running up and down stairs, if the total heights of the steps made are the same. By comparison the subjects did work equivalent to climbing and descending a flight of steps over 1780 feet high, approximately 1.4 times the height of the Empire State Building. Additional evidence of the severity of the work is given by the subjects' reports at the end of the experimental cycle. All reported feeling tired and weary, and all except two who were in the very best of physical condition, due to active participation in athletics or other equivalent regular exercise, reported muscular stiffness and soreness for three or four days following. All but one subject finished the required amount of exercise, however; this one subject was forced to quit after approximately ten minutes of the final fifteen minute period of exercise had elapsed.

3. *Measurement of "Fatigue."* In order to increase the precision of the experiment means were sought for equating the exercise for each subject in terms of the amount of "fatigue" experienced. This would have been possible if some reliable quantitative measure of "fatigue" could have been applied to each subject, the exercise being continued until some previously determined point was reached. Unfortunately, no readily applicable techniques for such measurement have been developed. A careful survey of the psychological and physiological studies of exercise and "fatigue" revealed the following possibilities: (1) measurement of the organic and metabolic changes of the subject; (2) measurement of the latency of certain

⁵ *Op. cit.*

reflexes; (3) measurement of work output in physical units (foot-pounds or kilogram-meters); (4) measurement of work decrement on some interpolated task; (5) subjective ratings of their physiological and psychological states by the subjects. However, consideration of the results obtained from such measures in previous studies, together with some preliminary experimentation on the last two, showed them to be too subject to fluctuation as a result of slight changes in extraneous conditions, and otherwise too unreliable to make possible either very accurate measurement or very reliable interpretation of the results.

As a consequence, the task to be performed by each subject was defined simply in terms of the rate of stepping and the length of the work period, which were made the same for all. Later consideration of results will show that the precision of the experiment was not appreciably reduced because of lack of more adequate equating of the exercise process from subject to subject.

4. *Recording of Observed Stuttering.* The observed stuttering was recorded in a manner similar to that described by Colley.⁶ The experimenter sat with his right hand on a mercury contact key which was concealed from the subject by a screen, and which was connected in series with an ink-writing polygraph in the adjoining room. This type of key has the advantage that no click results from making or breaking an electrical contact which may serve as a cue to the subject as to when he has been judged to have stuttered. The ink-writer made a continuous line on a paper tape which ran through the polygraph at a constant speed of eight mm. per second. The line was displaced to one side when the key was depressed, continuing to write in this new position until the key was again released. The experimenter depressed the key whenever he judged a moment of stuttering to be initiated and released it as soon as the moment of stuttering was judged to be ended. In this way both the frequency and duration of the observed stuttering blocks were recorded.

The reliability of the experimenter in observing stuttering was determined in two ways. The first was a modification of the method reported by Johnson and Brown⁷ and by Mann.⁸ The experimenter

⁶ Colley, W. H., "The Relation of Frequency to Duration of Moments of Stuttering," M. A. Thesis, State University of Iowa, (1939).

⁷ Johnson, W. and Brown, S. F., "Stuttering with Relation to Various Speech Sounds," *Quarterly Journal of Speech*, XXI (1935), 481-496.

⁸ Mann, M. B., "Stuttering in Relation to Speech Sounds of Young Children," M. A. Thesis, State University of Iowa, (1937).

listened to a phonograph record of the speech of three stutterers on each of four consecutive days. Copies of the recorded passage were placed on a metal sheet which was connected into the polygraph circuit. When stuttering was observed a stylus, also connected to the polygraph, was used to pierce the paper, thereby marking the word on which stuttering had been heard, and simultaneously making contact with the metal plate and completing the polygraph circuit. Since the stylus was held down until the stuttering was judged to be ended, two records were thus obtained: one, a record of the exact words upon which stuttering was heard; two, a record of the observed duration of each of these stutterings. An index of agreement with respect to the words judged as having been stuttered⁹ was computed, and was found to be 0.92. Intercorrelations¹⁰ between each two days with regard to the judged duration of the stutterings observed on the two days were also computed. The average intercorrelation was found to be 0.98.

By a second method, the agreement of the experimenter's recording of stuttering with the recording of two other observers was determined. On each of four consecutive days the experimenter observed two five minute samples of the oral reading of a stutterer. On each of these samples a second observer recorded with him, two observers each day, one for each five minute sample of reading. Both the experimenter and the second observer were furnished with keys connected to the polygraph, so arranged that neither knew when the other was depressing his key. The agreement with each of the two observers was computed for each day by using the formula,

$\frac{c}{\sqrt{xy}}$, in which c is the number of words marked by *both* observers

⁹ Agreement was determined by use of the formula, x/y , in which x is the number of obtained agreements and y is the maximum possible number of agreements. Counts were made of the number of words marked on each of the four days, of the total number of different words marked during the four days, and of the number of words marked on all four days, on three days only, on two days only, and on one day only. The number of agreements on each word was computed from the formula, $.5n(n-1)$ which gives the possible number of combinations of the members of a given series taken two at a time. In this case n was the number of times that a given word was marked. The agreements on each word were summed to give the number of obtained agreements. The maximum number of possible agreements was computed by multiplying the total number of different words marked by six, since if a word was marked each of the four days the experimenter would have agreed with himself a total of six times.

¹⁰ Pearson product-moment correlation coefficients.

and x and y are the total numbers marked by each. The average of the eight agreement coefficients thus obtained was 0.90.

III. RESULTS

Four measures of the amount of stuttering were obtained for each reading of each passage. 1. *The frequency of stutterings* was found by counting the number of observed stutterings recorded on the polygraph tape. 2. *The total stuttered time* in seconds was secured by measuring each displacement of the ink-writer to the closest one-half millimeter, totaling the lengths thus obtained and dividing by eight, the speed of the tape in millimeters per second. 3. *The mean duration of stutterings* in seconds was computed for each subject by dividing the total length of his stutterings, as recorded on the tape, by his frequency of stutterings, and then by eight, the speed of the tape in millimeters per second. 4. *The per cent of time stuttered* was obtained by dividing the total stuttered time, as obtained in 2, by the reading time for the passage in seconds, each reading having been timed with a stop-clock.

Table I presents the means and standard deviations of these measures for the twenty-one subjects. The control values in each case were obtained by averaging the two values from the two control conditions for each subject, and computing the values given in the table from a distribution of these twenty-one average control values.

The most important things to be noted from this table are the general tendencies shown by the means, and the variability of the subjects with respect to these measures as indicated by the standard deviations. Comment on the general tendencies will be reserved until consideration of the graphically presented data. The most obvious thing about the standard deviations is their considerable relative magnitudes, compared to their respective means. In the case of *total time stuttered* the standard deviations exceed their respective means in eight of the twelve cases. For the other measures they are smaller, except for the fourth passage of the experimental condition for *mean duration of stutterings*, but in all cases they are relatively large. These large standard deviations are the result of two characteristics of the sample studied. First, the variability from subject to subject with respect to these measures was relatively great. Second, the distributions all showed a considerable positive skew. Most of the values were grouped quite closely toward the low end of the distributions with a few extreme values at the upper

end.¹¹ It is not known to what extent this form of distribution is typical of the population of stutterers in general. Everyday observation would seem to indicate, however, that very severe stuttering is relatively infrequent and that stutterers with very severe

TABLE I

MEANS AND STANDARD DEVIATIONS OF MEASURES OF AMOUNT OF STUTTERING, BY PASSAGES, FOR CONTROL AND EXPERIMENTAL CONDITIONS.

(Values given for *Control* are averages of the two control conditions of the experiment.)

		PASSAGES					
		1	2	3	4	5	6
Frequency of Stutterings							
<i>Control</i>							
Mean		79.6	78.6	84.5	79.9	71.4	70.5
S.D.		57.88	59.66	66.62	75.55	60.58	64.18
<i>Experimental</i>							
Mean		86.0	76.6	81.7	76.3	70.6	61.7
S.D.		64.99	66.75	70.99	74.11	66.97	58.50
Mean Duration of Stutterings (in seconds)							
<i>Control</i>							
Mean		1.03	0.89	1.09	1.01	0.87	0.83
S.D.		0.81	0.38	0.80	0.62	0.33	0.33
<i>Experimental</i>							
Mean		0.79	0.73	0.87	1.04	0.79	0.82
S.D.		0.34	0.29	0.58	1.33	0.27	0.38
Total Time Stuttered (in seconds)							
<i>Control</i>							
Mean		88.6	86.6	104.5	95.0	79.1	76.8
S.D.		83.93	85.72	113.38	113.53	61.06	52.74
<i>Experimental</i>							
Mean		79.9	67.1	84.3	75.0	64.2	57.9
S.D.		85.70	75.54	102.65	84.75	75.91	68.52
Per Cent of Total Reading Time Stuttered							
<i>Control</i>							
Mean		21.4	21.0	22.9	20.8	19.0	18.5
S.D.		12.95	13.82	15.92	15.00	12.82	14.88
<i>Experimental</i>							
Mean		20.1	17.9	19.7	19.1	17.7	16.3
S.D.		13.82	13.90	16.12	15.23	11.78	13.69

¹¹ An important point is the extent to which this skew might lower the validity of the statistical treatment of these data. The sampling error techniques used in this study were developed on the assumption of normal distribution of the population sampled. The considerable skew shown by the sample casts doubt on this assumption. However, it has been shown that the sampling distribution of means may be very normal in form even though the population distribution is considerably skewed. Hence, it is not probable that the statistical analysis is seriously disturbed because of possible lack of normality in the population distribution.

difficulty deviate further from the "typical" stutterer than those with mild difficulty. It is probable, therefore, that the distributions for this sample are not greatly in error as a description of the general population of stutterers.

Comparison of the standard deviations for the experimental conditions with those for the control conditions do not show any con-

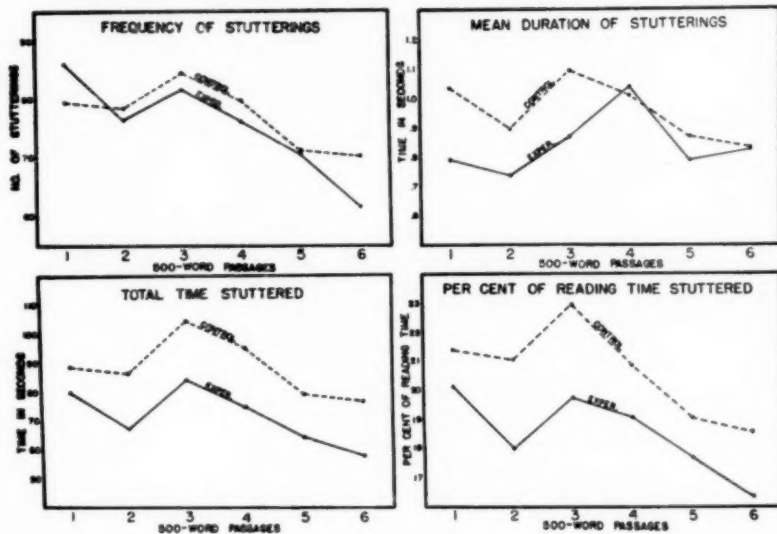


FIGURE 1

Graphs of the Measures of Stuttering. Each point is the mean of the values for the twenty-one subjects, the values for the two control conditions having been averaged separately before averaging to obtain the group means.

sistent tendency for those of the experimental condition to be larger. Differences between conditions with respect to their standard deviations are small and no larger than can reasonably be attributed to chance. Hence, it does not appear that the variability of the results was unduly increased by a failure to adequately equate the exercise process for different subjects.

Figure 1 presents graphs of the means found in Table I. The points connected by the broken lines are values obtained by averaging the values of the two control conditions; the points connected by the solid lines are the values from the experimental condition.

Two characteristics of these graphs will be noted. First, on all four the absolute magnitude of the measures of stuttering are greater in general on the control curve than on the experimental curve. Second, if the discrepancy in absolute magnitude is disregarded, the

two curves are very similar in form in all cases. The general differences in amount of stuttering between the averages of the control conditions and the experimental conditions are due to the fact that the stutterers tended systematically to stutter less on each successive cycle of the experiment, perhaps because of adaptation to the reading material and experimental situation. Since this difference was

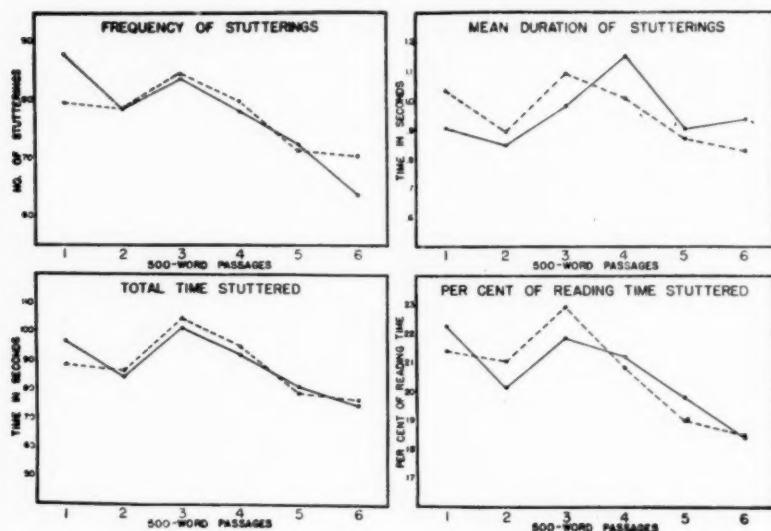


FIGURE 2

Superimposed Graphs of the Measures of Stuttering. The values of each experimental condition curve (solid line) have been increased by an amount equal to the mean of the differences between each pair of values in the original graphs of Figure 1.

greater between cycle one and cycle two than between the last two cycles, the averages of the values for the first and third cycles, the control conditions, are in general higher than the value for the experimental condition. This general difference in absolute amount of stuttering is not important, however, to the comparisons to be made. The question is whether or not the experimental variable of exercise, interpolated between each two passages of the experimental condition, operated to produce any differential effect with respect to changes in amount of stuttering on successive passages, within that series of six passages, as compared to the control conditions during which rest was substituted for exercise. The important consideration is the trends shown by the curves rather than the absolute heights.

In order to facilitate such comparisons the curves in each graph

were superimposed by increasing the values of each experimental curve by an amount equal to the mean of the differences between the six pairs of points on the original curve. The superimposed curves of Figure 2 show how similar in form the curves are. The fit of the pairs of curves for *frequency of stutters* and *total time stuttered* is especially close. All show very similar trends for the

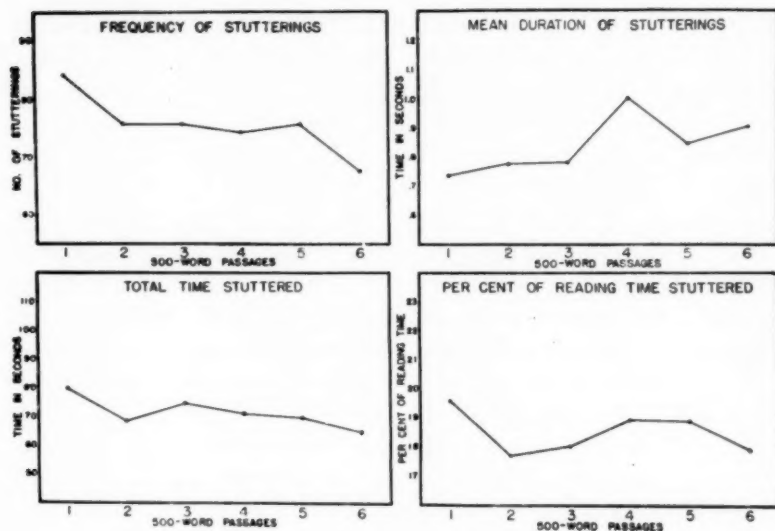


FIGURE 3

Graphs of the Adjusted Means of the Experimental Condition Obtained from Analysis of Covariance.

experimental and control conditions. For all measures except *mean duration of stutters* the trend shown for both experimental and control conditions is toward slight decrease in stuttering when the first and last passages are compared. All show irregularities with some increase of stuttering for the third and fourth passages, but the only curve which shows any over-all tendency toward increase of stuttering following exercise is the experimental curve for *mean duration of stutters*. Even in this case the fit to the corresponding control curve is quite close and the trend toward increase is slight.

A statistical test of the goodness of fit of these pairs of experimental curves can be made, providing certain assumptions are granted. These assumptions are: (1) that the method of superimposing the curves which was used is valid, (2) that the control condition curve for each measure of stuttering represents an exact hypothesis to which the goodness of fit of the experimental condition curve may

be tested. The test used was the epsilon-prime-square test described by Peters and Van Voorhies.¹²

A second type of statistical analysis was also applied to the data, the analysis of covariance developed by Fisher.¹³ In applying this analysis it is assumed that all points on the control curve for a given measure of stuttering would be equal except for (1) random variations due to chance factors, and (2) systematic differences between passages, such as, differences in difficulty of the reading material, adaptation during the process of the control cycle, etc., and that these same systematic factors apply equally, except for chance, to the experimental condition. On this assumption certain systematic differences would be expected between values of the experimental curve, even though the experimental variable of exercise had no effect at all on the speech of the subjects. The analysis of covariance provides a method for adjusting the values of the experimental curves in terms of these expected differences found in the corresponding control curves.¹⁴ The adjusted means for the experimental conditions are given in the graphs of Figure 3. It will be noted that, wherever differences of like direction on both the experimental and control curves of Figures 1 and 2 had obtained, the curves of the adjusted values have been straightened out. Differences remaining between the adjusted values are either due to the operation of the experimental variable or to chance factors operating within the experiment. A test of the statistical significance of these remaining differences is also provided by the analysis of covariance. The critical statistic for this test is the F-ratio which has been computed for each set of stuttering measures.

The results for both types of statistical analysis are given in Table II, together with the values which must be exceeded by these statistics in order for them to attain significance at the 5% and 1% levels of confidence. Although the epsilon-prime-square values more

¹² Peters, C. C. and Van Voorhies, W. R., *Statistical Procedures and Their Mathematical Bases* (New York, 1940), pp. 327-330. It is probable that this test overestimates the significance of any differences obtaining between the curves, since no account is taken of the sampling fluctuations of the control curves. This factor should be kept in mind in interpreting the statistical analysis.

¹³ Fisher, R. A., *Statistical Methods for Research Workers*, Sixth Edition, (London, 1936), chap. viii. For a relatively simple exposition of the analysis of covariance cf. Lindquist, E. F., *Statistical Analysis in Educational Research* (New York, 1941), chap. vi. or Snedecor, G. W., *Statistical Methods* (Ames, Iowa, 1940), chap. xii.

¹⁴ The regression coefficients between the experimental and control arrays of data are used to effect this adjustment.

nearly approach significance than the values of F , probably for reasons already given,¹² it will be noted that for none of the measures are the obtained statistics significant at even the 5% level of confidence. This means, in the case of the epsilon-prime-square test, that there is no departure of the experimental curves from their corresponding control curves which is not attributable to chance factors, and in the case of the covariance analysis, that all differences remaining between the adjusted experimental means for each measure may

TABLE II
RESULTS OF STATISTICAL ANALYSIS

MEASURE OF STUTTERING	OBTAINED STATISTICS*	
	ϵ'^2	F
Frequency of Stutterings	.041	.799
Mean Duration of Stutterings	.015	.681
Total Time Stuttered	.040	.151
Per Cent of Reading Time Stuttered	.043	.109

*For the number of degrees of freedom obtaining for the statistical analysis of these data, ϵ'^2 must exceed .049 to be significant at the 5% level of confidence (probability of 95 in 100 of a reliable difference) and .081 to be significant at the 1% level of confidence (probability of 99 in 100); F must exceed 2.29 to be significant at the 5% level of confidence and 3.17 to be significant at the 1% level of confidence.

be chance differences and may not be interpreted as indicating any real effect of the experimental variable upon the measures of stuttering employed.

The only conclusion that can be drawn from these data, therefore, is that there was no statistically reliable tendency for stuttering, as measured in this study, to change as a result of the exercise which was interpolated between passages during the experimental condition. It should be noted also that, with the exception of the *mean duration of stutterings*, such trend as is shown by the data is in the opposite direction from that which would be predicted from the hypothesis that "fatigue" resulting from muscular exercise tends to produce a decrement in fluency in the speech of stutterers.

IV. SUMMARY

Twenty-one stutterers read the same six five hundred-word passages on three different cycles of an experiment with one week between each two cycles. On the middle one of the three cycles a set amount of comparatively severe muscular exercise was interpolated

¹² See footnote 12.

between reading passages. The speech of the subjects was observed on each of the readings, stuttering being recorded by means of a polygraph. Measures were made of the *frequency of stutterings*, *mean duration of stutterings*, *total time stuttered*, and *per cent of total reading time stuttered*.

1. With the exception of *mean duration of stutterings* the trends shown by the data were very similar for the experimental and control conditions, the tendency being toward a slight decrease in amount of stuttering during the reading of a series of six passages. The data for *mean duration of stutterings* showed a slight increase during the experimental condition, but the departure from the trend shown by the corresponding control data was of a minor order.

2. No statistically significant effect upon stuttering as a result of interpolation of exercise between reading passages was found for any of the measures used.

V. DISCUSSION

Attention is again called to the fact that exercise, such as that used in this experiment, is only one of many variables which may constitute "fatiguing" situations. Moreover, this experiment was designed with a view to isolating this variable as far as possible. There was no pressure on the subject to "do well," and the experimental situation involved a minimum of the emotional element found in competitive sports and many other forms of strenuous physical exertion. The predominant psychological effect from the exercise process of the study, aside from the feelings of weariness, etc., was probably an attitude of boredom and distaste. The data of this study may therefore be accepted as essentially correct¹⁶ without necessitating a rejection of the complex hypothesis that "fatigue" in general may adversely affect the speech of stutterers. It is scarcely possible, however, to accept these data as correct and maintain the position that the physiological results of such exercise are important variables in producing the observed effects on stuttering of "fatigue." Further dimensional analysis of the complex phenomenon of "fatigue," including its psychological components, is necessary before reaching any important conclusions concerning its relationship to stuttering.

¹⁶ These data should not, of course, be interpreted as *proving* that no difference in stuttering results from such exercise as that used in this experiment, since it is a basic principle of statistics that a "null hypothesis" can never be proved by experiment; cf. Lindquist, E. F., *op. cit.*, pp. 15-17. However, the hypothesis of no difference cannot be rejected from these data, and the above discussion is based on the assumption of its essential correctness.

PHONEMIC MICROTOMY: THE MINIMUM DURATION OF PERCEPTIBLE SPEECH SOUNDS

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THE investigation of the minimum duration of perceptible speech sounds is of considerable importance from both a theoretical and practical point of view. In the first place, the determination of such minima may contribute to an extension of the concept of the phoneme itself by aiding in the discovery of those minimum distinctive features which Bloomfield¹ proposes for the phoneme. The reduction of perceptible speech sounds to their minimum duration may result in the elimination, in part, at least, of the non-distinctive features.

In the second place, data may be secured on the stability or instability of certain speech sounds in a given dialect or between different dialects. To what extent, for example, does a vowel which, in ordinary speech, may easily be identified, even when rapidly uttered, maintain its characteristic vocality when reduced in point of time to an extremely short duration? Do these minimum distinctive features persist essentially unchanged throughout the duration of the sound?

Third, from the point of view of applied phonetics, the ability to identify sounds of short duration may be an indication of the ability to recognize fine shadings in the sounds of connected speech, as in dialectal studies. This ability is of particular value in what is called "close" or "narrow" transcription, in which the attempt is made to recognize and to indicate definitely those delicate differences to be found in various dialects, and different modes of pronunciation within any given dialect.

The present investigation attempts to do no more than to arrive at some indication of possible duration minima for speech sound perception. Some approach to the problem may be made by a consideration of the average duration of the sounds of normal speech. Brigrance² cites William Jennings Bryan as having uttered that portion of his "Cross of Gold" speech which was recorded shortly before

¹ Bloomfield, L., *Language* (New York, 1933), chap. v, "The Phoneme."

² Brigrance, W. N., "How Fast Do We Talk?" *Quarterly Journal of Speech*, XII (1926), 337-342.

his death, at the rate of 150 words per minute. The average number of sounds per word is approximately four. At this rate, then, Bryan was uttering sounds at the rate of 600 per minute, or ten per second, an average of .10 second per sound.

The rate of speech exclusive of the pauses and periods of silence was investigated by Cowan,³ who reported that while "the mean average rate of speech during the uninterrupted flow of speech within phrases was 213 words per minute . . . individual average rates [varied] from 136 to 320 words per minute." At the rate of 320, approximately 1280 sounds per minute are being uttered, an average of 21.37 per second, or .0467 second per sound.

These are, of course, averages for all sounds, vowels and consonants alike. It is probable that durations shorter than this average are those of certain consonants, and the longer durations are those of continuant consonants and the vowels. It would be difficult, if not impossible, to separate them to determine the average duration of the vowels alone, partly because there is no sharp dividing line between vowels and consonants, and partly because in utterance the one sound merges into the next so gradually that one cannot say where the one leaves off and the other begins.

A detailed discussion of the previous studies on this subject has been presented by Gemelli and Pastori,⁴ who describe the various techniques and results of earlier investigators. According to Stefanini and Gradenigo, only two vibrations are necessary to establish a "tonal sensation;" although it must be admitted that, as Stefanini suggests, discrepancies in the results of various investigators are probably due to the lack of agreement on the definition of "tonal sensation." The figure, two vibrations, is considerably smaller than that determined by Bode⁵ for the perception of pitch.

P. Gianfrancheschi concluded that the minimum duration of a vocalic tone is a constant for the various sounds and that it is calculated not in terms of the number of vibrations but in terms of a period of time. This duration is a physiological constant, and repre-

³ Cowan, M., "Pitch and Intensity Characteristics of Stage Speech," *Archives of Speech, Supplement*, (1936).

⁴ Gemelli, A., and Pastori, G., *L'Analisi Elettroacustica del Linguaggio* (Milano, Italia, 1934), "La durata minima di un fonema sufficiente per la sua percezione," I. 149-162. The following discussion of these studies is adapted from this reference.

⁵ Fletcher, H., "Useful Numerical Constants of Speech and Hearing," *Bell System Technical Journal*, IV, No. 3; Bell Telephone Laboratories Reprint B-142-1.

sents the time necessary for the organ of hearing to adapt itself to the sound that is produced exteriorly.

Abraham and Bruehl observe that the duration of perception probably varies with the pitch of the sound. However, it must be noted that these two investigators studied only the minimum time necessary to perceive the tonality, that is the pitch, of the sound.

In a later investigation, Kucharski concluded that, to give tonal sensation, one single period of vibration can be sufficient, and in certain conditions, with one-half period of vibration one can have the perception of tonal difference, a fact which had already been noted by Stefanini.

To determine the minimum duration for the recognition of a phoneme, Gemelli and Pastori made oscillograms of the five Italian vowels both in isolation and in phonetic context. The same subjects made both recordings, in as nearly the same tone of voice as possible. It was assumed that the isolated vowel gave a characteristic or "typical" wave form for that particular sound, and that within the series of waves representing the vowel in phonetic context would be found waves that resembled those of the isolated vowel sufficiently to call them also "typical" waves for that vowel.

In the vowel spoken in context, however, there would be additional waves varying in form from these "typical" waves, due to the proximity of preceding and following sounds, in part, and also to the necessity for a period of formation for each sound. These possess some, but not all of the characteristics of the "typical" waves, and hence are called "atypical."

Having made oscillograms of known vowels, and also additional oscillograms of the same vowels in phonetic context, conclusions relative to the minimum duration of a phoneme necessary for its recognition were based on the number of "typical" cycles present in the vowel in phonetic context.

From this study it was concluded that "the number of these typical cycles can be reduced to a minimum of two; and this can be seen either from the subjects with the lower or from those with the higher [more acute] voice; from which we can deduce that such a minimum is independent of the duration of the cycle itself."

Although Gemelli and Pastori present no data on the actual *perception* of vowels of these extremely short durations, they assume that such perception is dependent solely upon the presence of typical wave patterns, and that the atypical waves have no relation to the essential vocality of the phoneme. But it is possible that these

atypical waves actually do make a contribution that is significant in such perception. Because their wave forms are slightly dissimilar one cannot say that two sounds themselves are totally dissimilar, or that the essential features of the phoneme are absent from either sound. Actually, the study of Gemelli and Pastori contributes nothing to the determination of the minimum duration of a sound necessary for its recognition.

The present investigation represents an attempt to apply to the problem a somewhat different technique from any which has hitherto been used. Essentially, it attempts to take from continuously uttered, isolated vowels smaller and smaller random segments, in point of duration, until these segments are reduced to unintelligibility, that is, until they are no longer recognizable as those particular phonemes. It is based on the assumption that, so long as a sound is *perceived* as a given vowel, even though it may consist of only a portion of a cycle, it has within it the essential characteristics of that vowel. In other words, whatever the wave form, or however short the sound itself may be, if it is still identifiable *to the ear* as a given phoneme, it makes little or no difference whether its wave form agrees with another wave form of that sound or not. In a continuously sounding vowel, therefore, any segment of sufficient duration to be identified should contain the essential elements of that vowel.

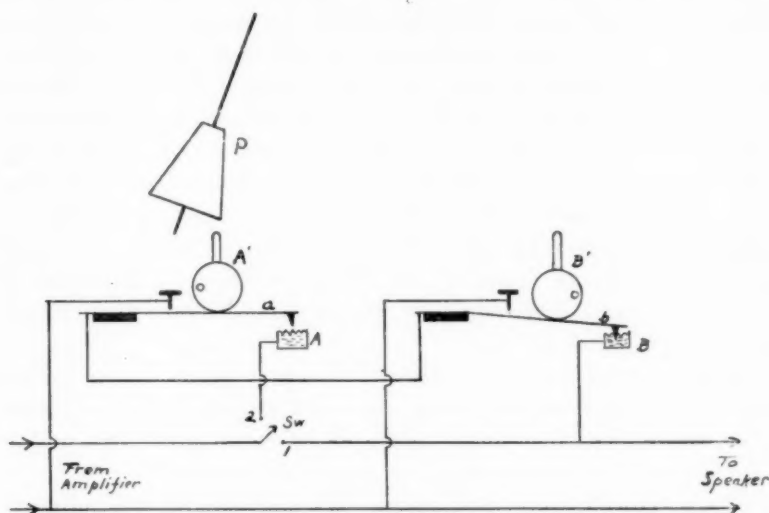
Just as an investigator in one of the biological sciences may study the essential structure of tissue by slicing off an extremely thin section of that tissue for microscopic examination, so it was thought that it might be possible to cut off, so to speak, an extremely thin portion of the speech sounds for subjection to examination and recognition. Consequently, a sort of "phonemic microtome" was devised, by which it was possible to reduce to smaller and smaller time units the sounds which were being studied. As the apparatus was finally assembled, it was possible, by means of a continuously variable adjustment, to reduce the intervals, or duration periods, down from about .07 second actually to zero. The longest time interval used in this study was .052 second, and the shortest .003 second. The former is somewhat longer than the average duration of sounds estimated from Cowan's study,⁶ and the latter somewhat shorter than the minimum determined by Gemelli and Pastori.

The apparatus consisted basically of a microphone, amplifier and loud-speaker combination, in the speaker circuit of which were interposed two mercury switches in series. The general quality of trans-

⁶ *Op. cit.*

mission was excellent. When used as a PA system no difficulty was experienced at any time in understanding what was being said; not only the individual timbre of the voices of those speaking, but the so-called "high-frequency" consonants as well were easily identifiable.

The two mercury switches were actuated by cams and lugs thrown by a heavy pendulum. The accompanying cut shows schematically the circuit and switch arrangement for controlling the duration of the sounds. An additional toggle switch (*Sw*) was placed in the



Circuit and Switch Arrangement for Controlling Duration of Vowel Sounds

circuit so that the voice current could be sent either directly to the speaker or through the mercury switches A and B. With the toggle switch in Position 1, the set-up became a simple PA system; but in Position 2, the current had to pass through the mercury switches, both of which must be closed, before it reached the loud speaker. Another set of switches, not shown in the diagram, permitted a 3-volt direct current to pass, instead of to the speaker, into a very sensitive time marker which was used to measure the duration of the intervals.

In the diagram it will be noted that mercury Switch A is open and B is closed. From a fixed point on the rigidly constructed support, the heavy pendulum (P) is released. Near the maximum velocity of its excursion it strikes the lug on Cam A', throwing it

to the right. The brass spring *a* is forced down so that the point at its tip is immersed in the cup of mercury immediately below. The circuit is now completed, and the current carrying the voice frequency is allowed to pass into the speaker. The observers may now hear any sound coming from the speaker, and identify it. But the pendulum continues its swing to the right, ultimately throwing the lug of the Cam B' on Switch B to the right. The movement of the cam permits the brass spring *b* to rise, and the tip at its end is drawn out of the mercury, breaking the circuit. The voice current is thus broken, of course, and the subjects no longer hear any sound.

Switch A was fixed permanently to the base of the apparatus, with Switch B movable along the length of an arc having the fulcrum of the pendulum as a center. The thumb screws placed immediately to the left of each cam, with leads down to the side of the output opposite that in which the mercury switches were placed, were so adjusted that they made contact with their respective springs the instant the points were withdrawn from the mercury. The effect was to eliminate all trace of disturbing transients. The length of each interval was determined by varying the distance between the two mercury switches.

After a given series of sounds at certain intervals and at certain frequencies had been presented, the switches were moved a little closer, the interval measured, and another series presented, and so on throughout the entire range of duration intervals.

Eleven vowels were used in all, including ten on the periphery of the vowel diagram, [i], [ɪ], [e], [ɛ], [æ], [ɑ], [ɔ], [o], [ʊ], [u], and the central [ʌ]. These are the most widely used in American speech, being common to all dialects or modes of pronunciation. It should be said, however, that while the subjects knew that only eleven vowels were being used, they did not know which eleven. These vowels were given at six frequencies: 80, 128, 192, 256, 320 and 384 c.p.s. The first three were spoken into the microphone by a masculine voice, and the last three by two feminine voices. Isolated vowels were used, without phonetic context.

Fifteen subjects participated in the investigation, being for the most part students in an intermediate class in phonetics, upperclassmen and graduate students. Two were regular members of the faculty of the Department of Speech who were auditing the course. There were eight men and seven women. All had been thoroughly trained in phonetics and in the recognition of sounds in normal utterance, and were thoroughly familiar with the International Phonetic Alpha-

bet, in which they recorded their judgments. Two of the fifteen did not complete the experiment, so that only thirteen were present when the shortest intervals were presented.

The main apparatus, with the microphone, amplifier and switch arrangement, were set up in the main laboratory of the Department of Speech, while the loud speaker was in a classroom across a wide hall. The doors to both rooms had double glass panels, so that no sound reached the classroom directly from the laboratory. Neither room had any peculiar acoustic characteristics by way of excessive reverberation, "dead" spots or an excessive amount of reflective surface; but both had been sound treated to eliminate special adverse effects. It is quite possible that "ideal" conditions, whatever that may mean, were not achieved; no particular attempt was made to insure perfection. Speculation as to what the results might otherwise have been is, of course, futile.

The mode of procedure was as follows: With the mercury switches set at a given distance and the time interval measured, a series of eleven vowels, without phonetic context, was spoken into the microphone, one after the other, at a frequency of 80 c.p.s. During the utterance of each vowel, the pendulum was permitted to swing down across the two switches, momentarily closing the speaker circuit so that the subjects, seated in a distant room, heard the vowel only for the time that *both* switches were closed. After the series of eleven had been completed, another series, in a different order, followed at a frequency of 128 c.p.s., and a third at 192. When all pitches had been utilized at this interval, the switches were moved a little closer, the interval again measured, and the vowel series repeated. A total of some thirteen intervals were used, ranging downward, as has been said, from .052 second to .003 second. It should be pointed out that the order of the vowels was changed each time in the presentation, so that there was no possibility of memorizing the order.

It is impossible to include in this report the complete data⁷ which were compiled from the investigation. They show individual variations as well as differences among the several vowels. But an examination of the condensed tables here presented reveals some inter-

⁷ Complete data on this study are on file in the Department of Speech at the Louisiana State University. They consist of some twenty-eight double page tabulations, including not only the record of each individual subject, but the record of all subjects for each vowel. The tables presented herewith are condensed from those individual tabulations.

esting items. Table I shows the number of subjects making correct recognitions of each of the eleven vowels at the different pitches and the different intervals, while Table II shows the number of sounds correctly identified by each subject for the different frequencies and intervals. Table I is to be read as follows.

In the left column are listed the eleven vowels used. Across the top are shown successively the different intervals, and under each one, the different frequencies. In the squares below are the figures indicative of the number of subjects correctly recognizing the particular vowel at each interval and frequency. Thus, at the interval of .052 second, thirteen recognized the vowel [i] at frequencies of 80 and 128 c.p.s., while fifteen recognized it at 192. Fourteen subjects correctly identified the vowel [o] at all frequencies at .052 second, and fourteen the vowel [ε] at all frequencies at the intervals of .04 and .03 second.

Table II is read similarly, except that it indicates the number of sounds recognized by each subject. Thus, GEP correctly identified all eleven vowels at 128 and 192 c.p.s., at the interval of .052 second, whereas CC recognized only seven at that interval and at 80 and 128 c.p.s. The consistently low scores of Subject CC are noteworthy, as are the consistently high scores of KM, CLS, GEP, GM and some others.

The actual number of cycles present in the sound as heard by the subjects may be determined by multiplying the interval by the frequency. Thus, at the interval of .01 second, frequency 80 c.p.s., only .8 cycle is heard by the subjects. Similarly, at the interval .005 second, pitch 128 c.p.s., only .64 cycle is actually heard.

With these facts in mind, let us examine the data in Table I. These data reveal that down to .0177 second nearly every vowel is correctly identified by from twelve to fifteen subjects, the exceptions being [ɪ], [e] and [u]. Likewise, at .01 second, except for [ɪ] and [e], every vowel is recognized at 80 c.p.s. by ten or more subjects. This sound contains only .8 cycle. At .00923-80⁸ (.738 cycle) nine of the eleven vowels are correctly identified by ten or more subjects.⁹ At .008-80 (.64 cycle) six of the eleven vowels were recognized by nine or more, while at .005-80 (.40 cycle) [ε], [æ],

⁸ In this notation, which will be used throughout the remainder of this report, the first figure represents the time interval and the second the frequency.

⁹ Only fourteen subjects were present for the intervals .013 and .00923, and only thirteen for the three shortest intervals.

[ɑ] and [ʊ] were recognized by nine or more. At .003-80 (.24 cycle) [ʌ] was recognized by ten and [æ] by nine. At .003-128 (.384 cycle) [æ] was correctly identified by twelve of the thirteen subjects, [ɛ] and [ɔ] by ten, [u] by nine and [ʊ] by eight.

The above data are in relation to the masculine voice. The feminine voices, of which two were used, show approximately the same interval identifications, the frequencies, and consequently the number of cycles, being higher. There seems to be no evidence from the data that the higher pitches were recognized at shorter intervals than the lower, an observation which is contrary to the findings of Gemelli and Pastori.¹⁰ Notice might be taken of the vowels [æ] and [ɑ] at .003-256 (.768 cycle), where every subject identified them correctly.

Turning now to Table II, equally significant information may be obtained. For example, in only one instance down to the interval of .005 second does KM fail to identify fewer than eight of the eleven vowels. CLS recognizes nine of eleven at .005-128 (.64 cycle) and eight of eleven at .005-192 (.96 cycle). BL recognizes ten of eleven at .005-128 (.64 cycle) and all eleven at .005-192 (.96 cycle). At .008-80 (.64 cycle) BL and LB identify correctly all eleven. At .003-80 (.24 cycle) GM correctly identifies seven, and BL and DL six each. Additional analyses may be made by a further examination of Tables I and II.

The probability that these judgments were the result of pure chance or guesswork may be calculated from the formula:

$$nCr = \frac{n(n-1)(n-2) \dots (n-1+r)}{r!}$$

The subjects were informed that there would be eleven vowels presented, but not which eleven had been selected. Assuming only fifteen vowels from which to make a choice, the probability that at least one of a series of eleven will be right is 11/15. The probability that a subject will guess *any two* correctly is 55/15², or 11:45, about one in four. Similarly, the chance of guessing any three is approximately one in twenty; of four, a little less than one in a hundred fifty; of five, somewhat less than one in sixteen hundred; for six, a little more than one in twenty-five thousand. The probability of guessing seven correctly is less than one in half a million; of eight, less than one in fifteen and a half million. It may be inferred

¹⁰ *Op. cit.*

TABLE I
NUMBER OF SUBJECTS IDENTIFYING EACH SOUND
AT EACH INTERVAL AND PITCH

Masculine Voice

t	.052		.04		.03		.02		.0177		.01		.01		.0093		.013		.00923		.008		.005		.003											
	f	80	128	192	80	128	192	80	128	192	80	128	192	80	128	192	80	128	192	80	128	192	80	128	192	80	128									
i	13	13	15	11	15	9	11	15	12	13	12	12	12	7	10	10	13	14	13	10	13	12	4	6	11	4	8	12	4	5	1					
l	7	12	9	8	9	15	7	14	11	2	12	13	6	12	14	7	6	11	9	7	11	6	8	12	10	8	9	5	3	4	1					
e	1	6	2	9	2	4	6	4	0	6	4	3	8	4	4	3	5	3	7	8	9	6	2	2	6	9	3	10	8	2	2	5				
E	14	13	14	14	14	14	14	14	14	13	14	13	14	14	13	11	14	15	14	12	14	11	12	10	8	13	11	12	11	4	0	10	9			
æ	15	14	6	15	8	15	15	6	14	15	11	15	15	4	10	14	9	13	15	13	14	14	5	14	14	9	12	11	8	13	8	9	12	9		
a	13	8	6	14	7	4	14	6	1	13	14	4	14	12	6	10	11	10	13	13	4	13	12	6	13	10	2	12	4	12	11	10	9	3	5	7
A	15	15	13	15	10	13	13	12	15	15	14	15	14	11	14	13	15	13	10	14	15	13	13	14	12	14	13	9	12	14	13	14	10	9	4	
o	19	12	7	14	13	5	14	11	14	15	12	6	15	15	12	13	3	11	14	14	12	11	14	12	14	12	8	13	10	5	8	7	4	10	0	
o	14	14	14	13	14	9	15	15	12	15	15	9	15	14	6	15	12	13	15	14	13	5	12	14	12	8	13	10	12	2	13	12	6	1	5	
u	15	15	15	13	14	5	14	15	15	14	13	15	14	13	12	15	14	15	13	14	14	13	13	14	9	10	13	9	11	13	3	8	5	5		
U	13	14	11	12	14	11	14	14	15	8	13	15	10	13	12	15	11	12	9	13	14	13	7	11	13	8	14	13	11	12	13	6	11	13	4	4
æ	159	186	112	140	132	100	185	132	115	130	140	114	127	139	111	125	117	124	131	109	121	125	134	100	122	123	111	99	101	73	101	102	89	70	30	

Feminine Voice

t	.05		.0417		.028		.022		.0167		.014		.01		.013		.00923		.008		.005		.003	
	f	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96
f	30	26	30	30	26	30	30	26	30	30	26	30	26	30	26	30	26	30	26	30	26	30	26	30
i	12	5	14	13	7	0	10	13	11	13	12	7	10	6	9	10	12	9	12	9	3	12	11	5
e	11	4	5	6	5	2	6	6	7	10	5	9	3	5	4	5	3	6	11	9	7	8	6	4
E	12	11	10	5	13	1	12	12	11	12	13	14	3	14	6	8	14	14	13	5	4	10	4	6
æ	15	15	13	13	14	15	10	14	15	15	15	15	15	15	15	15	15	14	13	13	13	13	10	13
a	13	9	12	10	12	4	15	5	10	11	13	9	15	15	12	13	14	8	13	9	6	11	12	9
A	10	4	8	12	6	11	13	7	14	12	1	13	9	6	14	7	6	14	4	3	8	5	10	8
o	4	9	1	4	2	0	5	15	6	7	11	0	9	4	2	4	11	1	14	15	10	9	5	11
O	14	1	14	10	8	10	3	12	12	10	12	13	11	2	11	10	1	15	11	11	3	5	11	3
u	1	6	5	3	1	2	3	5	4	1	14	14	3	9	11	4	13	4	8	15	9	6	12	6
U	7	5	4	2	1	15	12	7	5	6	6	11	10	1	6	9	5	3	6	15	14	13	8	5
æ	114	25	86	93	90	67	102	104	101	113	124	108	115	104	81	112	109	62	118	132	108	96	74	72

TABLE II
NUMBER OF VOWELS IDENTIFIED BY EACH SUBJECT AT
EACH INTERVAL AND PITCH

Masculine Voice

f	.052	.04	.03	.02	.0177	.01	.0092	.013	.00923	.008	.005	.003
f	80 128 192	80 128 192	80 128 192	80 128 192	80 128 192	80 128 192	80 128 192	80 128 192	80 128 192	80 128 192	80 128 192	80 128 192
HM	9 11 11	9 9 9	11 11 11	10 11 11	9 11 11	9 9 9	9 9 9	8 11 11	9 11 11	9 9 9	8 8 7	7 6 6
LS	11 10 8	10 10 9	11 10 9	10 9 8	10 10 7	11 8 9	11 10 8	11 11 8	10 10 9	9 7 6	9 8 9	7 4 7
MC	10 9 6	10 9 6	10 9 6	10 9 6	11 10 5	11 11 7	10 10 8	11 11 8	9 10 7	5 6 7	6 7 11	1 2 4
CE	9 11 9	9 9 9	10 9 9	9 10 10	9 11 11	9 8 10	9 7 7	11 11 9	8 11 9	6 7 9	5 7 9	4 5 4
BL	9 10 7	9 10 7	9 9 8	11 7 9	10 9 9	9 10 8	9 7 10	9 11 9	9 8 9	11 6 8	6 10 11	6 7 3
GE	9 11 11	11 9 10	9 10 8	9 9 9	9 11 11	9 10 9	9 11 9	10 11 11	11 11 9	7 7 10	8 8 9	4 6 5
LB	9 8 7	8 8 6	10 9 8	7 9 5	10 9 8	10 5 7	10 11 8	11 11 8	11 7 11	9 10 6	7 7 2	4 5
CB	8 8 6	7 9 6	8 8 7	7 8 10	7 9 7	7 8 7	9 6 7	9 6 7	9 7 8	7 11 5	7 6 5	6 2
DMS	10 9 8	9 9 7	9 10 8	8 10 6	10 10 8	11 10 8	11 10 9	10 10 7	9 7 7			
GM	10 9 7	10 10 6	10 9 8	10 10 8	10 10 9	9 7 8	10 10 9	10 9 10	7 10 8	7 10 4	8 7 7	6 4
DL	10 8 6	11 8 6	9 8 7	10 6 9	8 5 7	8 8 8	8 7 8	10 9 8	6 7 8	7 11 6	10 9 6	6 3
BN	9 8 6	10 9 8	10 8 8	10 10 6	9 9 6	7 10 9	10 11 8	9 9 8				
RNP	10 9 8	10 8 7	7 7 7	7 7 7	7 5 8	6 7 6	7 5 7	10 6 9	4 8 10	7 7 8	4 6 7	4 8 4
LS	6 7 10	8 10 6	4 9 7	7 9 11	7 4 2	5 8 9	9 9 6	4 11 6	7 9 8	7 10 7	5 7 9	2 3 3
CC	7 7 4	8 5 4	5 5 5	6 6 7	5 5 5	3 3 3	5 5 5	6 6 4	5 5 5	6 6 7	4 7 2	2 3 1
MS	133 136 112	140 132 100	135 132 115	130 140 114	139 140 117	131 139 121	131 139 121	135 139 121	135 139 121	135 139 121	135 139 121	135 139 121

Feminine Voice

f	.05	.0417	.028	.022	.0167	.014	.01	.00923	.008	.005	.003	
f	25 30 36	25 30 36	25 30 36	25 30 36	25 30 36	25 30 36	25 30 36	25 30 36	25 30 36	25 30 36	25 30 36	
HM	10 5 7	7 8 6	11 9 7	10 11 8	9 7 7	7 7 7	6 11 9	7 9 10	5 8 11	9 7 9	5 7 6	5 5
LS	7 5 6	7 7 4	5 5 5	6 6 8	7 7 7	7 7 3	9 7 7	10 8 9	4 5 11	7 8 5	5 8 7	5 5
MC	5 6 6	5 5 5	10 7 8	10 9 6	7 6 7	6 11 5	1 6 9	11 8 9	10 8 10	8 9 7	6 9 7	4 3
CE	6 6 5	7 3 5	8 5 8	10 6 8	7 5 8	8 6 8	10 6	11 8 5	10 7 8	8 9 7	5 4 4	2 5
BL	5 6 7	7 5 6	6 6 8	5 9 7	7 8 5	9 10 4	7 8 8	11 8 9	11 8 10	10 9 11	7 7 6	5 4
GE	7 4 7	5 7 7	9 7 9	10 7 9	8 4 11	7 7 11	10 7	10 7 7	11 7 6	6 6 5	5 4 6	3 0 2
LB	8 6 3	9 5 6	6 7 5	8 10 6	8 7 6	4 5 9	8 8	10 8 10	7 7 9	9 7 7	5 4 5	3 2
DMS	7 7 5	5 3 5	5 7 8	7 7 7	7 7 7	5 6 5	9 9 6	9 9 8	10 7 10	7 7 7	7 3 4	5 4
GM	7 2 5	6 6 3	7 5 7	6 8 7	7 6 5	6 8 3	5 8 4	9 9 7	9 7 5	9 9 7	7 3 6	4 4
DL	6 6 8	5 4 8	6 6 9	7 7 7	7 5 6	7 5 9	9 8	9 8 7	11 7 9	8 8 7	3 6 8	6 4
BN	9 4 7	8 6 9	7 8 7	6 6 7	7 5 8	10 6 11	9 8					
RNP	8 6 7	6 5 3	4 5 7	4 8 4	5 5 4	4 2 7	6 4	9 8 7	6 9 8	6 4 6	3 6 1	4
LS	6 5 5	5 6 3	6 7 9	7 7 8	6 4 9	6 5 6	9 10	9 11 8	11 7 7	9 10 7	4 6 4	2
CC	4 4 3	3 3 5	3 8 7	4 6 7	11 9 5	7 10 3	9 9 6	9 5 11	5 5 5	6 7 5	5 5 4	3 4
MS	114 75 86	93 90 67	102 104 101	113 126 108	115 106 81	112 109 62	118 133 103					

from these calculations, therefore, that the correct identification of five or more vowels in the series is a matter of something more than mere chance or guessing, and that they are real identifications. The presumption is very strong that there are in the sounds which pass through the transmission system enough of the determining characteristics of those sounds to enable the subject not only to say that they differ one from another, but to say with considerable certainty just what particular sounds they are. When every subject identifies [æ] as [æ] at .005-80 (.40 cycle), there is a negligible probability that this identification was arrived at by mere chance. Similarly, the probability that GM was able to guess seven vowels out of eleven at .003-80 (.24 cycle) is less than one in a half million.

Another interesting item, which does not appear in the data as here presented, may be found in the type of errors, when the vowels were incorrectly identified. There is a fairly high degree of consistency in these errors, except at the extremely short intervals. Not only are the mistakes consistent, but they follow a fairly well defined pattern, in that when a vowel is not recognized as the one which was spoken into the microphone, it was judged to be one lying nearest to it on the vowel diagram which most phoneticians accept as representing the variations in at least one aspect of sound formation, namely, tongue position.

For example, when [i] was spoken into the microphone, the most frequent error was [ɪ]. Acoustically and physiologically, the two vowels are close together; in fact, many phoneticians consider [ɪ] to be little more than a lax form of the tense [i]. It might be pointed out, in this connection, that the acoustic spectra of these two vowels, as given by Crandall and Sacia¹¹ are very similar, the characteristic centroids of energy lying quite close together.

The vowel [ɪ] presents extremely interesting errors. Although it is quite close to [i], it was most frequently heard as [e], even at the longest intervals; while [e], on the other hand, was most frequently heard as [ɪ] for all intervals and at all frequencies. However, at .003-80, ten of thirteen subjects identified the [e] as [ɛ].

[ɛ] itself seems to have been heard correctly by all observers, for the masculine voice, at all intervals and all pitches down to .005-192 (.96 cycle), where only four were correct. At the longer

¹¹ Crandall, I. B., and Sacia, C. F., "A Dynamical Study of the Vowel Sounds." *Bell System Technical Journal*, III (1924) No. 2, 323-7. See also, Crandall, I. B., "The Sounds of Speech," *Bell System Technical Journal*, IV, No. 4 (October, 1925), 1-39.

intervals, practically all the errors were made by one subject, who was unable to recognize the sound even at the longest interval, .052 second. At .003-192 (.576 cycle) nine of thirteen subjects identified the sound correctly. For the feminine voices, especially at the highest pitches, [ɛ] moves down to [æ], and occasionally up to [e].

[æ] seems to be heard correctly at all intervals and pitches, for all voices, except that for the highest pitch (384) it often moves up to [ɛ]. Less than 18 per cent of all errors made on this sound are made at the two lower pitches of the masculine voice.

At the highest pitches of the masculine voice, [ɑ], usually considered to be a most stable vowel, moves most often to the central [ʌ]. But for one of the feminine voices [ɑ] goes to [æ], for the most part. [ʌ] shifts to [ɑ] or [ɔ], when incorrectly identified, for all intervals and all pitches. [ɔ] likewise moves to [ʌ] or [ɑ], or occasionally (for the second feminine voice) to [o] or [u]. When wrongly identified, [o] becomes, for the most part, [u]; [u] becomes [u] for the masculine voice, [ʌ] or [o] for the first feminine voice, and [o] or [u] for the second feminine voice. [u] drops to [ʊ], with an occasional [o] or [ʌ].

Although other errors are made, the tendency seems to be to hear a vowel, if not correctly, then at an adjacent vowel. Only occasionally is one heard more than one degree removed, and it is very seldom that a front vowel is heard as a back, or a back vowel as a front. In nearly every instance the subject making the erroneous identification hears a vowel which has at least one centroid of energy approximately in common with the original.

The pitch at which the vowel is spoken seems to affect the correctness of identification to some degree. In general, fewer errors are made at the lower pitches than at the highest, although this relationship is by no means constant. The observation holds true for nine of the thirteen intervals used by the masculine voice, and eight of the twelve used by the feminine voices. At the extremely short interval of .003 second, however, almost fifty per cent more recognitions are obtained at 128 c.p.s., which is nearer the normal pitch median of the masculine voice than is either the higher or lower pitch. Similarly, the frequencies of 320 and 384 are somewhat high for the feminine speaking voices; sixty per cent more recognitions are obtained at .003-256 than at either of the other pitches at this interval.

Most of the subjects in the experiment habitually use the General American mode of speech, only three being definitely classed as

Southern. There is no evidence that ability to identify the vowels was affected in one way or another by the characteristic usage of any of them. The Southern speaking subjects were as effective as were the users of General American in identifying the vowels spoken by General American speakers. The first feminine voice was distinctly Southern; yet the users of the Southern modes of speech were no more successful in identifying her vowels than were the General American speakers.

The vowels themselves are not equally recognizable at such short

TABLE III
RANKINGS OF THE VOWELS IN FREQUENCY OF RECOGNITION

Vowels	Masculine Voice .052-.0023	Masculine Voice .013-.003	Masculine Voice .005-.003	Masculine Voices Total	Feminine Voice .05-.01	Feminine Voice .013-.003	Feminine Voice .005-.003	Feminine Voices Total
[i]	4	9	(8.5)	7	2	8	(10)	2
[I]	10	10	(10.5)	10	4	9	(11)	6
[e]	11	11	(10.5)	11	11	11	(8.5)	11
[ɛ]	3	3.5	(4)	2	5	7	(4)	4.5
[æ]	6	1	(1)	5	1	1	(1)	1
[ɑ]	8	5	(5)	9	3	2	(2)	3
[Λ]	2	6	(7)	3	7	10	(6.5)	7
[ɔ]	9	7	(8.5)	8	10	6	(5)	10
[o]	7	8	(6)	4	6	4	(6.5)	4.5
[ʊ]	1	2	(2)	1	9	5	(8.5)	9
[u]	5	3.5	(3)	6	8	3	(3)	8

intervals as were used in this study, nor is the same vowel equally recognizable for the different voices. Table III presents the rankings of the eleven vowels for the different voices and for the intervals indicated, as determined by the number of recognitions.

If frequency of identification is a criterion, then for the masculine voice it appears that, in general, the most easily identifiable vowel is [ʊ] with [ɛ], [Λ], [o] and [æ] following in close order. At the shortest intervals, however (.005 and .003 second), [æ] takes first place, with [ʊ], [u], [ɛ] and [ɑ] next in order. For the feminine voices, [æ] is the most easily recognized, with [i], [ɑ], [ɛ], [o] and [I] following. At extremely short intervals, [æ] still leads, followed by [ɑ], [u], [ɛ] and [ɔ] in that order.

For all voices, as for most subjects, the most difficult vowels to recognize are [e] and [I], with the former consistently lowest in frequency of identification, except for the second feminine voice in the two shortest intervals, when it is replaced by [I].

CONCLUSIONS

In view of the data here presented, the following conclusions seem warranted:

1. It is possible to devise a technique whereby one may present to a group of subjects a series of speech sounds of any desired duration, from several hundredths of a second down to zero.
2. By the use of such a technique one may approach a determination of the duration minima for the perception of these sounds.
3. These minima do not seem to be the same for all English sounds, some of them being recognizable at shorter periods than others.
4. Individual differences exist among the subjects, some of them being able to identify a significant number of vowels at shorter periods than others.
5. Some subjects are able to identify a significant number of speech sounds when presented with a duration of as little as .003 second. Duration minima of from 1/200 to 1/333 second permit recognitions of some of the vowels by some of the subjects.
6. A significant number of the speech sounds used in this experiment was recognized by some of the subjects when less than one complete cycle of the fundamental frequency was present, .24 cycle being the minimum presented. Recognitions of this segment of a cycle occurred, and recognitions at .384 and .64 cycle were frequent.
7. At extremely short intervals recognition seems to depend to some extent on the proximity of the pitch at which the vowel is spoken to the normal median pitch of the voice.
8. Except at extremely short intervals, the vowels seem to be more readily recognized at the lower pitches than at the higher.
9. The most unstable vowels in the general American mode of speech seem to be [e] and [ɪ], judging from the frequency with which the subjects failed to recognize them at any interval.
10. The fact that the subject habitually uses the same regional mode of speech as the voice coming through the loud speaker of the transmission system does not increase his ability to recognize the vowels of that voice, at the intervals used in this study.
11. For the feminine voices, the most frequently recognized vowel was [æ], followed by [i], [ɑ], [ɛ], and [o]. For the masculine voice, the most frequently identified vowel was [ʊ], followed by [ɛ], [ʌ], [o] and [æ]; although but for one subject, who made seventy per cent of the errors on [ɛ], from .052 to .0093, this vowel would have been at or near the top of the list of easily rec-

ognized vowels for the masculine voice. At the shortest intervals, .005 and .003 second, at the frequencies of 80, 128 and 192 c.p.s., the most frequently recognized vowel was [æ], followed by [ʊ], [u], [ɛ] and [ɑ]; while for the frequencies of 256, 320 and 384, at these intervals the order of frequency of recognition was [æ], [ɑ], [u], [ɛ] and [ɔ].

12. In general, errors of identification follow a consistent pattern. When not recognized correctly, a vowel is usually identified as one "adjacent" to it, as indicated on the vowel quadrilateral, that is to say, one which has with it at least one centroid of energy at or near the same frequency region.

AMERICAN SPEECH PREFERENCES

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THE well-known differences in dialect among New Englanders, Mid-westerners and Southerners, as well as the existence of various minor dialects in the United States, have led to two theories concerning the "best" or "correct" American speech. The regional standard theory was recently stated by Wise as follows: "The tendency now is to recognize the three great regional dialects of the United States as correct, each standard in its own area, and each thoroughly acceptable among educated people everywhere."¹ About a decade ago, the London standard theory gained some vigorous proponents in the United States. This view held that the speech of southern England was a desirable norm for educated persons in all parts of the English-speaking world.

Such theories have been based on general observation rather than on experimental or statistical data. It would accordingly be of some interest to secure expressions of dialect preference from representative groups of Americans and to compare such preferences with these theoretical formulations.

PROBLEM

It was the purpose of this study to investigate dialect preferences throughout the United States. It was anticipated that such a study would (1) throw light on the extent of regional differences in attitudes toward dialects, (2) test the generally accepted hypothesis that people prefer dialects most like their own, and (3) furnish an experimentally determined order of preference for the major dialect types.

PROCEDURE

The experiment was conducted essentially as follows: groups of listeners in various parts of the country heard a specially prepared series of phonographic recordings of various dialects, and indicated their reactions to each dialect on rating scales. The general methodology of this study had been pre-tested in a preliminary study by the authors.² Analysis of the data in this earlier study made possible

¹ Wise, C. M., *Foundations of Speech*, ed. J. M. O'Neill, (New York, 1941), p. 17.

² Wilke, W. H., and Snyder, J. F., "Attitudes toward American Dialects," *J. Soc. Psychol.*, XIV (1941), 349-362.

various refinements in procedure for the present investigation, such as a more adequate choice of dialect samples, better standardized instructions, and a simplified rating scale. Whereas the preliminary investigation was conducted in only five localities, the present study included samples of opinion from all sections of the United States.

To secure *bona fide* samples of the characteristic speech of different regions, acetate recordings of the speech of over a hundred persons from many parts of the United States and elsewhere were made.³ The speakers were all men, and all read the same selection, which was so phrased as to illustrate the principal phonetic characteristics of various dialects. From these recordings, thirty-two were selected as suitable for experimental purposes; they were satisfactorily similar in rate of reading and normality of vocal characteristics and were adequate illustrations of regional types. The actual experimental records were prepared by re-recording the thirty-two dialect samples in a carefully arranged order designed to achieve a maximum of contrast between adjacent samples. To aid in making the experiment self-administering, each sample was preceded by the recorded announcement of its number in the series. A brief description of the types of speech included will be found in the section on results.

In order to standardize the manner of giving instructions, a detailed description of the nature of the experiment was recorded, and constituted the first record played to subjects in each locality. Instructions emphasized particularly that differences in voice or manner should be disregarded as far as possible in rating, and attention focused on each speaker's dialect or style of pronunciation.

Each subject was furnished with a pad of questionnaires. The first sheet asked for the subject's age, sex, and principal places of residence. The remaining sheets (see Figure 1) were made up of the two-item rating scale and a third question and map affording an opportunity for guessing the regional origin of the speakers.

Choice of subjects was based on the view that results should reflect the opinions of that sector of the population likely to discriminate between generally acceptable and sub-standard speech, yet typical enough of fairly well-educated persons to avoid any biases due to

³ It was made possible for the authors to record the speech of many visitors to New York City immediately upon their arrival by the courtesy of officials of the Y.M.C.A. residential hotel, Wm. Sloane House, and we are especially grateful to Mr. Chessor Bowles and Mr. Arthur E. Hofmire for their assistance in this undertaking.

special study and emphasis on details of speech. College students in elementary courses appeared to fit this requirement. As a check on the difference between their attitudes and those of younger and older persons, groups of high school students and adults were included. Results are based on the reactions of 2,470 subjects in forty localities distributed throughout the United States as shown in Figure 2. Arrangements for conducting the experiment in each of these localities were made with colleagues in the National Association of Teachers of Speech, whose collaboration has been elsewhere acknowledged and without whose assistance the entire project would have been impossible. Each collaborator was sent, at a date previously scheduled, a set of experimental records, needles, questionnaires and a letter of instructions.

Replies to items 1 and 2 of the questionnaire were scored from 1 to 9 for the nine steps along the broken lines, the lower value indicating the most unfavorable rating. Replies to item 3 were tabulated, converted into percentages, then entered on copies of the maps to show the distribution of guesses for each speaker by subjects from a given locality.

RESULTS

1. *Reliability*

The reliability of average ratings of dialect samples based upon experimental groups of forty and sixty subjects was investigated by comparison of ratings obtained from random halves of these groups. For the first group, the rank-difference correlation between order of preference for the dialect samples was .924 for item 1 and .926 for item 2. For the group of sixty subjects, the corresponding coefficients were .830 and .893. It is evident that the size of the total group is ample for satisfactory reliability.

Whereas the above figures demonstrate the adequacy of groups of forty to sixty individuals for a reliable indication of the reactions of a single group performing the experiment under the same conditions, it is also important to learn whether ratings by a group of this size are closely comparable with ratings obtained from another group of individuals from the same locality who heard the records on a different occasion. There would necessarily be certain differences, in rooms, equipment, selection of subjects, etc., in any such repetition of the experiment. Rank-difference correlations between ratings by two New York City groups of forty and fifty-nine subjects respectively were .88 for item 1 and .90 for item 2. The same comparison was made for thirty-five vs. fifty-two subjects from the

NUMBER _____

1. Do you like this type of pronunciation?

Strongly
dislike

Dislike
moderately

Uncertain

Like
moderately

Like
very much

2. Would it be an advantage for you to have this type of pronunciation in your everyday life?

Definitely
not

Probably
not

Uncertain

Probably

Definitely

3. Where do you think this type of speech is from? (Indicate your opinion by placing the number of this selection on the map below.)

Comments: _____

NUMBER _____

1. Do you like this type of pronunciation?

Strongly
dislike

Dislike
moderately

Uncertain

Like
moderately

Like
very much

2. Would it be an advantage for you to have this type of pronunciation in your everyday life?

Definitely
not

Probably
not

Uncertain

Probably

Definitely

3. Where do you think this type of speech is from? (Indicate your opinion by placing the number of this selection on the map below.)

Comments: _____

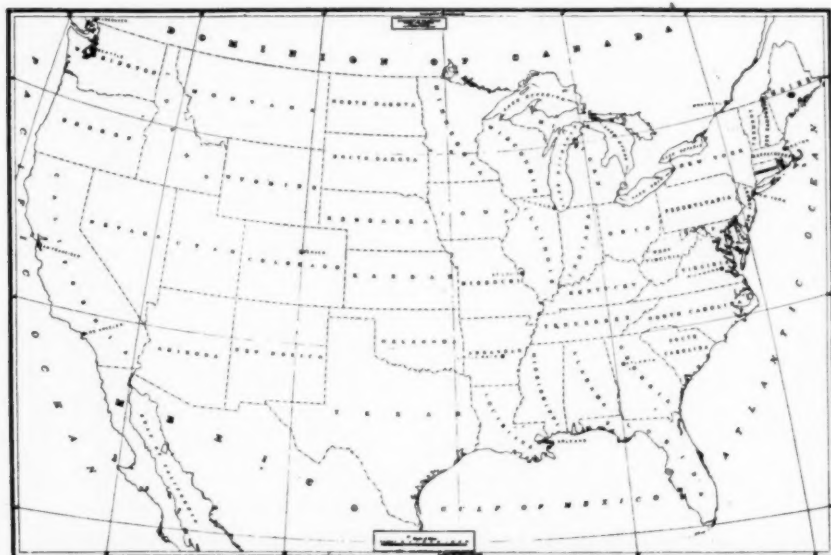


FIGURE 1
The questionnaire

Maine group, where the correlation was found to be .90 and .92 for items 1 and 2.

To determine whether the results were much affected by the proportion of male to female subjects, correlations were determined for 112 males and 111 females, representing four localities. The average of the six coefficients (four for item 1 and two for item 2)

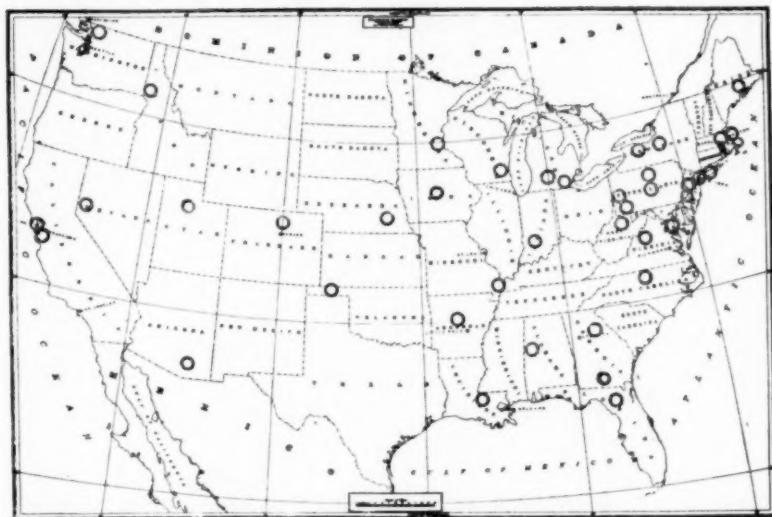


FIGURE 2

Distribution of Localities in Which Experiment Was Performed. The Two Circles in the New York City Area Each Represent Two Groups of Subjects.

was .915. Data on effect of age on ratings is less complete, but some indication of the substantial relation between ratings by high school students and adults is indicated by a correlation of .75 based on sixty students and fourteen adults.

2. *Validity*

The validity of the data secured in this experiment depends upon the extent to which subjects reacted to the dialects heard on the experimental records rather than to other factors. Quantitative indication of validity by correlation with an external criterion does not seem applicable to this problem. An estimate of the validity of the results must be made, therefore, on the basis of such consideration as the nature of the experimental conditions and the general trend

of the results. As mentioned above, the recorded speech samples were so arranged as to differ conspicuously from adjacent samples, and the recorded instructions emphasized that ratings should be based solely on dialect or type of pronunciation rather than on voice quality or other factors. Item 3, concerned with regional identification, perhaps the most interesting aspect of the experiment to the subjects, also served to re-enforce the instructions by keeping the listeners attentive to dialectal variations. Comments of subjects, both written and oral, indicated that attention had been given to variation in type of pronunciation.

Despite these favorable influences, the presence of certain extraneous factors must be noted. The voice quality of the speaker was probably the most important of these, and despite the attempt to select speech samples which varied within a restricted range, there were still observable differences in pitch level, intonation pattern, apparent emotional attitude, and timbre. A few unusual characteristics were deliberately retained to test their effect on the ratings.

A general estimate of the validity of the data as a measure of dialect preference therefore depends upon the balance between these influences, and is presented in terms of the specific characteristics of the various records in the discussion of the average order of preference for the thirty-two samples.

An effort was made to rule out the effect of position in the series of stimuli by requesting collaborators to play the experimental records in normal order for half the subjects and in the reverse order for the other half. That such a precaution was useful is indicated by the drop in correlation as compared with the reliability coefficients. Whereas the latter were above .90 for large groups, the average of 13 rho's found by comparing the order of preference based on normal and reverse order of records was .83. Because the average rating of a dialect sample judged in both orders was considered a more valid indication of its true rating than the rank based on a single arrangement of the records, this average figure was used in the computations for all groups where both orders had been used.

3. *Aesthetic judgment versus estimate of utility*

It might seem, *a priori*, as indeed it did seem to the experimenters, that subjects would differentiate between types of speech which they liked and types which they preferred for their own use. That is, a foreign accent or regional dialect might conceivably be thought pleasant to hear yet not desired by the listener for his own everyday use.

Accordingly, items 1 and 2 of the rating scale dealt with these two questions. However, it was soon apparent from casual inspection of the data that most subjects failed to respond differentially to these two items. Ten correlation coefficients between items 1 and 2, based on 491 subjects, averaged .95; none of the coefficients was below .92. For this reason, only item 1 was used in the final computations of preferences.

4. *Order of preference for thirty-two dialect samples*

The main purpose of the experiment was to arrive at an order of preference for the various dialect samples on the basis of the opinions of subjects representing all sections of the United States. Since it would be impracticable to assemble a single representative group for this purpose, the method followed was to conduct the experiment in forty separate localities. Ratings of the dialect samples by subjects from a given locality were scored and averaged. Arranging these average scores in order of magnitude indicated the order of preference for the dialect samples in that locality. The order of preference of each of the forty groups is shown in Table I.

If the United States is divided into "dialect areas" as suggested by Henry L. Smith,⁴ it will be observed that the localities in which this experiment was performed are fairly well distributed among these areas, with a greater concentration in the areas of largest population. The only area not represented is area 2, which contains

⁴ This map of dialect areas is reproduced by permission of its author, Dr. Henry Lee Smith, Jr., and of *Scholastic* magazine. In his more recent work, Dr. Smith has made important changes in the boundaries of areas 3 and 7. In a letter to the writers dated May 19, 1942, these changes are described as follows: "Area 3 is bounded by a line running fifty or so miles west of Harrisburg, then swinging sharply to the east so as to exclude the entire northern quarter of Pennsylvania but to include the northern part of New Jersey and a region a hundred miles or so west of the Hudson River and the Hudson Valley region up as far as Poughkeepsie. This makes the majority of northern Pennsylvania and western New York a transitional dialect area between area 2, western New England, and area 7, the Middle West. Also, the line separating area 1 from area 2 should swing farther into Maine." In a supplementary communication Dr. Smith adds that he would not have any definite line between areas 2 and 7, but by some system of shading would show area 2 passing into area 7; in other words there would be a transitional belt rather than a boundary line separating these areas. Because of the distribution of our experimental samples and the high intercorrelation between areas in preference ratings, these changes would not significantly affect the results of this experiment. For regional identification of an individual speaker, however, the revision of boundaries is clearly important.

TABLE I
ORDER OF PREFERENCE FOR 32 RECORDED DIALECT SAMPLES IN EACH
LOCALITY WHERE EXPERIMENT WAS PERFORMED

SPEAKER	LOCALITY																				
	New York City	Flushing, L.I.	Worcester, Mass.	Orono, Me.	Port Wash- ington, L.I.	Syracuse, N.Y.	New Bruns- wick, N.J.	Philadel- phia, Pa.	State College, Pa.	Rochester, N.Y.	College Park, Md.	Lockhaven, Pa.	Valdosta, Ga.	Gainesville, Fla.	University, La.	Harrisonburg, Va.	Chapel Hill, North Car.	Conway, Ark.	University, Ala.	Athens, Ga.	
1	13	29	22.5	15.5	27	15	27.5	25	14	24.5	16	15.5	11	14	11	8	7.5	11	14	15	
2	20	22.5	20	18	21	31.5	15	19	21	21	19	17	25	22	27	21	27.5	26	22	23	
3	28	24	22.5	25	30.5	25	22.5	28.5	21	26	24.5	20	20	19	23	22	25	24	28	24.5	
4	30	32	30	32	32	28.5	30.5	32	30.5	31	32	30	32	28.5	32	31	30	31	32	32	
5	29	27	29	29	28	27	27.5	27	30.5	28	29	28	30	28.5	28.5	29.5	23	29	27	29	
6	3	4	6.5	3	16	3.5	3	3	5.5	4.5	3.5	3	4.5	3	3	4.5	7.5	2	4	1	
7	7	8.5	3	13	3	7	6	11.5	4	2	13.5	4.5	6	6.5	7	8	16.5	6	13	4.5	
8	11.5	6	6.5	7.5	5	12.5	6	5	8.5	8	5.5	10.5	9	10.5	13.5	14	11.5	12	8	7	
9	15	13	9	10	2	16.5	17	9.5	5.5	4.5	10.5	10.5	11.5	3	11	12.5	5	14.5	10	11	
10	1.5	2	2	2	1	2	2	2	2	1	2	2	2	3	2	3	3	4	3	2	
11	22.5	26	26	28	25	26	26	28.5	27.5	27	28	25.5	29	25.5	26	27	27.5	28	25	27	
12	6	8.5	6.5	14	8	9.5	4	7	12.5	7	5.5	9	8.5	15	11	4.5	6	8	6	13.5	
13	26.5	25	27	26	26	23	25	24	26	29	27	25.5	28	30.5	28.5	28	29	27	29	31	
14	8	3	11	7.5	10	11	12	4	3	13.5	3.5	4.5	4.5	8	5	15	1	7	2	11	
15	9	10.5	13.5	5	11	5	8	9.5	10	3	8.5	15.5	7	10.5	8.5	10.5	14.5	13	13	7	
16	14	22.5	18.5	11.5	20	31.5	12	19	17	15.5	17	21.5	22	21	18	17.5	18	21	17	17.5	
17	4	7	4	11.5	17	6	12	14.5	15	17.5	13.5	18	14	6.5	8.5	17.5	19	20	19	17.5	
18	17	14	18.5	4	6	12.5	10	16	7	6	10.5	18	14	6.5	8.5	19	16.5	17	18	19	
19	17	17	16	21	22	20.5	20	17	18	11.5	20	19	19	19.5	21	19	16.5	17	18	19	
20	11.5	12	15	15.5	14	12.5	18	13	32	32	13.5	13.5	15	16	13.5	6	9	14.5	11	16	
21	31	30	31	31	30.5	30	32	30	32	32	31	32	31	32	31	32	32	32	30	30	
22	25	28	22.5	19	9	20.5	29	26	23	19.5	24.5	31	17	17.5	19.5	23	26	19	20.5	24.5	
23	32	31	32	30	29	28.5	30.5	31	29	30	30	29	27.5	30.5	22	29.5	31	30	31	26	
24	22.5	20.5	28	23.5	24	24	24	22	25	22	21	24	26	23.5	22	24	20	25	20.5	21.5	
25	10	10.5	12	7.5	12.5	8	6	8	16	19.5	7	12	3	4.5	4	2	14.5	3	5	11	
26	20	15.5	13.5	23.5	15	16.5	16	14.5	24	13.5	18	13.5	18	12.5	6	16	11.5	16	16	4.5	
27	24	15.5	22.5	21	15	18	20	19	19	11.5	24.5	21.5	21.5	27	19.5	20	24	18	24	20	
28	6	5	10	7.5	12.5	3.5	9	6	8.5	9	8.5	8	16	12.5	17	8	10	9	9	9	
29	1.5	1	1	1	4	1	1	1	1	10	1	1	1	1	1	1	2	5	1	7	
30	26.5	19	17	21	18	20.5	22.5	21	21	23	22	27	24	23.5	24.5	25.5	22	22.5	26	28	
31	20	20.5	6.5	17	19	9.5	14	11.5	11	15.5	13.5	6	11.5	9	15	12.5	13	10	15	13.5	
32	17	18	25	27	23	19	20	23	27.5	24.5	23	23	23	25.5	24.5	25.5	21	22.5	23	21.5	

TABLE I, CONT'D.

SPEAKER	LOCALITY																				
	Bloomington, Ind.	Minneapolis, Minn.	Ann Arbor, Mich.	Waukesha, Wis.	E. Lansing, Mich.	California, Pa.	Slippery Rock, Pa.	Ames, Ia.	Fairmont, W. Va. college group	Fairmont, W. Va. high school group	Salt Lake City, Utah	Reno, Nev.	Greely, Colo.	Stanford U., Cal.	Berkeley, Cal.	Moscow, Idaho	Cape Girardeau, Mo.	Tucson, Ariz.	Bellingham, Wash.	Goodwell, Okla.	Lincoln, Neb.
1	16	15.5	28.5	10	9	3	13	17	18.5	5.5	30.5	4	10.5	16	14.5	12	6	8.5	13.5	16	19.5
2	23.5	20	25	20	15.5	25.5	21.5	21.5	25	22.5	28	21	18.5	14	13	21	1	26	21	22	27
3	23.5	26.5	27	22.5	28	22	26.5	31	17	21	22.5	27.5	22	24	25	19	24.5	24	20	28.5	30
4	31.5	31	32	29.5	32	31	31	31	32	30	32	31	31	32	31	31	27	29.5	31	30	32
5	29	29	28.5	25	29.5	30	29.5	28	27.5	28.5	25.5	29	28	29.5	25	29	32	29.5	30	31	28
6	2.5	1	8	4	17.5	6	7	14	9	10	5.5	3	3	3.5	4.5	2	2	7	16.5	1	3
7	4.5	9	6	17	9	15	15	8	1	1.5	4	4	10.5	11	3	11	5.5	5.5	3	9	12
8	12	6	12.5	5	10.5	12.5	10	10	6	4	9.5	13	13.5	10	9	8.5	19.5	16.5	16.5	7	10
9	6.5	21	14.5	10	13	18	18.5	14	14	19	7.5	16	5.5	12	21	17.5	12.5	4	13.5	14.5	8
10	2.5	2.5	1.5	1	2	8	2.5	1.5	2	3	1	2	2	2	2	3	5.5	3	1.5	4	2
11	25	28	24	24	27	25.5	28	23.5	24	25	20.5	25.5	25	25	25	25.5	23	24	26	23	24
12	8	15.5	6	18	14	17	18.5	7	9	14.5	5	17	13.5	13	8	8.5	11	8.5	10	20.5	7
13	27.5	25	20.5	29.5	21	28	26.5	21.5	26	28.5	22.5	27.5	29.5	29.5	19	23.5	30.5	20	27	26.5	21.5
14	4.5	18	4	6	12	7	13	6	5	14.5	3	6.5	10.5	6	6	14	7.5	13	10	11	4.5
15	9	4	6	10	3	9.5	2.5	9	12	12.5	12	5	4	3.5	7	5	7.5	5.5	4	7	4.5
16	19	18	20.5	19	17.5	15	13	20	18.5	16	25.5	18	18.5	15	14.5	19	21	16.5	13.5	20.5	25
17	6.5	7	3	15.5	10.5	4	9	14	3.5	17	9.5	14	16	5	4	8.5	3	10	10	13	16
18	14.5	11.5	9	3	7.5	2	4.5	3.5	20	8	16	6.5	15	18.5	19	8.5	10	11	5	5	10
19	17.5	23	20.5	14	24	20	20	14	16	20	18	19.5	23.5	22	23	15	22	21	23	12	19.5
20	17.5	13	17	13	15.5	19	11	14	7	10	7.5	10	7.5	17	16.5	16	12.5	16.5	8	14.5	14.5
21	31.5	32	30	32	31	32	32	30	32	30.5	32	32	32	28	28	32	28.5	32	32	32	31
22	26	24	23	21	19	23	21.5	30	27.5	18	27	22	20	26	31	22	25.5	19	23	17.5	14.5
23	30	30	31	31	29.5	29	29.5	28	31	27	29	25.5	29.5	31	31	25.5	28.5	31	28	26.5	29
24	21	26.5	17	28	22	25.5	25	28	29	30	20.5	24	23.5	20.5	22	27.5	30.5	22	29	28.5	26
25	10	5	12.5	7.5	6	5	4.5	6	12	5.5	17	11.5	10.5	8.5	10.5	6	16.5	13	6.5	3	10
26	14.5	18	11	22.5	20	12.5	16	25	15	12.5	15	15	17	20.5	19	17.5	14	16.5	19	19	17
27	20	14	20.5	15.5	25	17	19	19	21	22.5	19	19.5	21	27	29	23.5	18	18	18	17.5	18
28	11	9	10	7.5	4	11	8	11	12	10	13	11.5	7.5	7	12	13	16.5	13	6.5	7	13
29	1	2.5	1.5	2	1	1	1	1.5	3.5	1.5	2	1	1	1	1	1	4	1	1.5	2	1
30	27.5	22	26	26.5	26	25.5	24	18	23	26	24	30	27	18.5	27	27.5	26	24	25	24	23
31	13	9	14.5	12	7.5	9.5	6	3.5	9	7	14	8	5.5	8.5	10.5	4	15	2	13.5	10	6
32	22	11.5	17	26.5	23	21	23	26	22	24	11	23	26	23	16.5	30	24.5	27	23	25	21.5

only about one quarter of one per cent of the population of the United States. The approximate percentage of the population in the other areas, estimated on the basis of the 1940 census, is as follows: Area 1, 6.1%; Area 2, .2%; Area 3, 16.1%; New York Metropolitan Area, 6.4%; Area 4, 4.1%; Area 5, 5.1%; Area 6, 19.4%; Area 7, 24.2%; Area 8, 16.7%. Figure 3 shows the approximate boundaries of these areas and the location within each of the places where the experiment was performed.

The second step in combining subjects' ratings was to average the rank order assigned each dialect sample by those groups within a single dialect area. The result, an order of preference for each area, is shown in Table II.

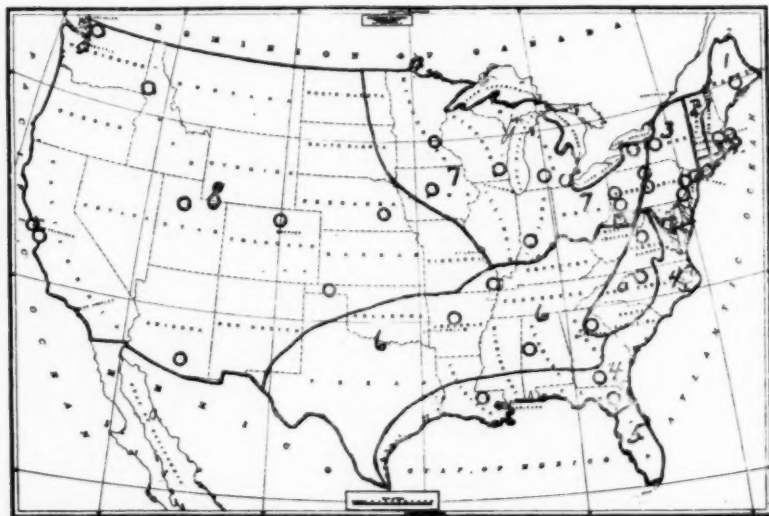


FIGURE 3

Localities in Which Experiment Was Performed in Relation to the "Dialect Areas" of the United States.

The final step was to combine the ratings in the nine areas into a single order of preference representing all sections. Because of the wide variation in the population of these areas, the rank of the dialect samples in each was multiplied by a factor proportional to the population of that area. Thus each area is represented in the final order of preference by a weight based on its population. The order of preference for the thirty-two dialect samples, based on

2,470 subjects, is indicated in Table III, together with a few pertinent facts regarding each of the speakers.

TABLE II

ORDER OF PREFERENCE FOR 32 RECORDED DIALECT SAMPLES IN EACH "DIALECT AREA." (AREA "A" REPRESENTS THE NEW YORK METROPOLITAN AREA.)

SPEAKER	AREA								Weighted average
	A	1	3	4	5	6	7	8	
29	1	1	2	1	1	4	1	1	1
10	2	2	1	2	2	2	2	2	2
6	3	3	3	3	4	1	6	3	3
7	7.5	6	4	6	12	7	7	5	4
14	5	8.5	6	5	8	6	8.5	6	5
25	11	11	11	4	9	5	4	9	6
15	10	8.5	9	8	13	11	5	4	7
17	5	5	14	16	5	3	8.5	8	8
28	5	7	8	17	11	8.5	11	10	9
12	7.5	12	7	11	3	10	13	11	10
8	9	4	5	10	14.5	8.5	12	14	11
18	14	13	12	9	19	19	3	12	12
31	20	14	13	12	14.5	14	10	7	13
9	13	4	10	7	10	12	16	13	14
20	12	16	15	15	6	16	15	15	15
26	17	17.5	16	14	16	13	17	17	16
1	21	20	20.5	13	7	15	14	16	17
19	15	17.5	17	19	17.5	17	18	20	18
16	18	15	19	20	17.5	18	19	18	19
27	19	23	18	22	20.5	20	20	21	20
2	22	20	20.5	26	25	24	23	19	21
32	16	26	24	25	22	22.5	21	23	22
22	28	22	23	18	26	21	22	22	23
24	23	25	25	23	20.5	22.5	26	26	24
30	24	20	22	24	24	25.5	25	27	25
3	27	24	26	21	23	25.5	24	25	26
11	25	28	28	27	28	27	27.5	24	27
13	26	27	27	28.5	29	29.5	27.5	28	28
5	29	29	29	28.5	27	28	29	30	29
23	32	30	30	30	30	29.5	30	29	30
4	31	31	31	31	31	32	31	31	31
21	30	32	32	32	32	31	32	32	32

5. Interpretation of dialect preferences

Analysis of the arrangement of samples in Table III suggests that the results follow certain general patterns. Those familiar with the preliminary study by the authors⁵ will observe that the present investigation corroborates each of the six conclusions of the earlier study.

The five most preferred samples of the thirty-two are entirely or dominantly of the General American dialect variety. The sample in

⁵ *Op. cit.*

TABLE III
ORDER OF PREFERENCE FOR 32 RECORDED DIALECT SPECIMENS AS JUDGED BY
NATION-WIDE SAMPLE OF 2,470 SUBJECTS

RANK	SPEAKER NO.	AGE	PRINCIPAL PLACE OF RESIDENCE	OTHER AREAS	PARENTAL LANG. INFLUENCE	GENERAL DIALECT CLASSIFICATION	INDIVIDUAL CHARACTERISTICS
1	29	27	Eric, Pa.	Pittsburgh	same area	G.A.	Voice quality + Articulation distinct. Radio announcer.
2	10	23	Brooklyn, N. Y.	1 year in Md.	m: Brooklyn f: Ind.	G.A.	Voice quality + Articulation distinct. A student at New York University
3	6	25	Wichita, Kan.	Brief trips abroad; worked on Texas ranch summers while in college.	m: Wichita f: Ireland	G.A.—S	Voice quality + Low pitch. Articulation distinct.
4	7	25	Everett, Wash.		m: Denmark and Minn. f: Iowa	G.A.	Voice quality + Intonation whiny. Articulation distinct.
5	14	34	St. Louis, Mo.			G.A. with strong British (stage) influence.	Professional actor.
6	25	24	Becker, S.C.		m: S. Car. f: Georgia	S	Voice quality + Articulation distinct.
7	15	24	Petaluma, Cal.	Stanford Univ.	m: Germany f: Brooklyn; Cal.	G.A.	Voice quality + Articulation distinct. Prominent s sound.
8	17	c.24	Brooklyn, N.Y.		New York City	E—NYC	Low pitch. Distinct sharp s.
9	28	33	Xenia, Ohio	NYC 9 years Roanoke, Va. 2 years.	Ohio	G.A.—S	Voice quality + Articulation distinct.
10	12	19	N.Y.C.		Russian Poland	E	Articulation distinct. Eastern "standard." Few New Yorkisms.
11	8	22	San Antonio, Texas		m: Texas f: Biloxi, Miss.	S	Voice quality + Articulation distinct.
12	18	25	Marshfield, Wis.		m: Wis. speaks Norwegian f: Wis. speaks German	G.A.	Somewhat sharp s.
13	31	36	Highland, N.Y.	N.J. 14 years, upper N.Y. State	N.Y. State	G.A.	

TABLE III, CONT'D

RANK	SPEAKER NO.	AGE	PRINCIPAL PLACE OF RESIDENCE	OTHER AREAS	PARENTAL LANG. INFLUENCE	GENERAL DIALECT CLASSIFICATION	INDIVIDUAL CHARACTERISTICS
14	9	26	Bethlehem, Pa.		m: N.Y.C. f: Ireland	G.A.—E	Colored speaker. Univ. graduate.
15	20	25	Darien, Ga.	Washington, D.C. 15 years	Darien, Ga.	E	Unvoicing of z. Falling inflection.
16	26	20	St. Albans, Vt.	Speaks Russian and Yiddish	Russia, N.Y.C.	G.A.	Voice a bit strident; low pitch. Somewhat sharp s.
17	1	31	Detroit, Mich.	Beacon N.Y. 2 years	Detroit	G.A.	Slight New Yorkese
18	19	18	N.Y.C.	Speaks Yiddish	m: Poland, N.Y.C. f: Austria, N.Y.C.	N.Y.C.—G.A.	
19	16	25	Hood River, Oregon		Illinois	G.A.	
20	27	21	Wheeling, W. Va.		Same	G.A.	Considerable Southern influence.
21	2	22	Eldorado, Ark.		Same	S	Somewhat sharp s. Background noise.
22	32	23	Fogi, Newfoundland	England 3 years. Pittsburgh, 1 year.	Newfoundland; England	Br—G.A.	
23	22	26	Baltimore, Md.		Same	G.A.	Background noise
24	24	46	London, Eng.		Same	Br.	Has studied elocution.
25	30	24	Danville, Va.		Same	S	
26	3	31	Everett, Mass.		m: Me. f: N.H.	E	Voice quality—Pitch high, somewhat sharp s.
27	11	37	Unalaska, Alaska	Speaks Aleut; in U.S. part of time for 14 yrs.	G.A.	G.A.	Noticeable foreign influence. Distinct articulation. Voice quality+ Suggests colored speaker; background noise.
28	13	21	Fairmont, W. Va.		Virginia	S.	
29	5	37	Newcastle-on-Tyne, Eng.		m: Norwich f: Newcastle	Br.	
30	23	19	Brooklyn, N.Y.		m: Poland	N.Y.C.—E	Yiddish influence.
31	4	22	New York City		f: France	N.Y.C.	Father an interpreter
32	21	31	Bombay, India	Speaks Marathi	Same	Foreign accent	

third place has a noticeable Southern influence, and the sample in fifth place has a strong influence of "stage" speech.

Samples described as Eastern or Southern are ranked just below this group of G.A. speakers. Those in 6th, 8th, 9th, 10th and 11th place are in two cases Eastern and in the other three cases Southern or G.A. with strong Southern influence.

Foreign speech tends to rate low in proportion to its departure from American dialectal norms. The sample rated lowest is a strong foreign accent of uncertain origin to those unacquainted with the speaker's background. The sample of northern British speech (resembling Scottish) was rated fourth from the bottom. Ninth from the bottom was a sample of London business men's speech (considered typical by other English hearers). The mixed foreign and G.A. speaker from Alaska was sixth from the bottom and the speaker from Newfoundland with a mixture of G.A. and British speech was eleventh from the bottom.

The speech of New York City, that is, those local characteristics sometimes called New Yorkese, tends to rate low in proportion to its noticeability in the individual speaker. The two most extreme samples of New Yorkese included in the study were ranked 30th and 31st out of 32 samples. Both types of speech represented by these speakers are widely prevalent in the New York metropolitan area, and are not restricted to a particular educational or economic level—both speakers were college students. A sample the experimenters would describe as "slight New Yorkese" was ranked 18th. A sample of a "speech conscious" individual who has eliminated most New Yorkisms, leaving a sort of Eastern "regional standard" speech was up in 10th place, and a similar case of a New York City resident with speech training aimed at an r-less Eastern standard was ranked 8th. In second place was a New York City resident whose family background was probably responsible for his dominantly G.A. speech with few traces of New York influence.

The voice quality of the most favorably rated speakers was pleasant and they tended to speak quite distinctly. The question arises whether these speakers were ranked high because the listeners liked their type of dialect or because they liked their voice quality and distinct articulation, or because of a fortunate combination of these factors. A reasonable conclusion must take into account the fact that the most favorably rated speakers with Eastern and Southern speech also had pleasant voice quality and distinct articulation, and that this was likewise true of the foreign samples rated 22nd, 24th

and 27th, of the Eastern sample rated 15th, and of the Southern sample rated 25th. On the other hand, samples with somewhat less pleasant voice quality, peculiarities of articulation, or loss of distinctness or pleasantness due to background noise in the recording, did tend to rate lower. Consideration of all these factors suggests that the general order of preference for the several dialects studied is as described in this section. It also seems clear that favorably regarded voice quality and enunciation are important factors in determining ratings, even when the subjects are instructed to ignore such factors and to rate dialect type alone.

6. Regional differences

That a very high degree of agreement in rating dialect samples was found is evident from Table IV, which shows the correlation between the order of preference for each area compared with every other, and for each area compared with the weighted average for all areas. The average of 28 rank difference correlation coefficients for the individual areas is .91 and all of the coefficients are high. Dozens of correlation coefficients between individual localities were first computed, to discover whether any clear-cut pattern of regional differences would emerge from such comparisons. No low correlation was found, and the figures run from moderately high to high without any consistent regional pattern. Obviously there is substantial

TABLE IV
RANK ORDER CORRELATION BETWEEN "DIALECT AREAS" SHOWING CLOSE
AGREEMENT IN RATINGS OF DIALECT SAMPLES BY SUBJECTS
FROM VARIOUS REGIONS

Areas	rho	Areas	rho
A and 1	.937	4 and 5	.876
A and 3	.945	4 and 6	.922
A and 4	.865	4 and 7	.917
A and 5	.902	4 and 8	.934
A and 6	.938	5 and 6	.930
A and 7	.867	5 and 7	.834
A and 8	.910	5 and 8	.887
1 and 3	.954	6 and 7	.882
1 and 4	.900	6 and 8	.940
1 and 5	.869	7 and 8	.950
1 and 6	.943	A and average	.935
1 and 7	.922	1 and average	.939
1 and 8	.941	3 and average	.947
3 and 4	.928	4 and average	.926
3 and 5	.877	5 and average	.899
3 and 6	.929	6 and average	.939
3 and 7	.916	7 and average	.932
3 and 8	.950	8 and average	.953

agreement throughout the United States in preference ratings for the thirty-two speech samples studied.

Aside from this generally close agreement, a few indications of regional difference may be found by analyzing the local and regional orders of preference shown in Tables I and II. The most significant of these are the following:

a. The speaker from California, in 7th rank (weighted average for all subjects), was ranked about 10th except in area 8 (far west) and area 7 (mid-west), where he ranked 4th and 5th respectively. This suggests a preference for the local variety.

b. The speaker from Wisconsin, in 12th rank, had an average rating of 14th place for all areas except the mid-west, but was rated 3rd in that area. A group of subjects from a Wisconsin college also put him in 3rd place. Preference for the familiar, local speech appears to account for these differences.

c. The speaker from South Carolina in 6th rank is placed about 10th in five areas, but 4th and 5th in areas 4 and 6 respectively (both southern). Note, however, that in area 5 (Piedmont) this speaker is in 9th place. It may thus seem that there is some tendency for local preference to affect these ratings, but it must be remembered that the mid-west area also rated this speaker 4th.

d. There is an apparent contradiction of preference for local speech in the case of the speaker from Highland, N. Y., in 13th place, who averages 14.6 in areas other than 7 and 8, but ranks 10th and 7th in these two (mid-west and far west). The meaning of this discrepancy may be that the G.A. speech of upstate New York is sufficiently similar to that of areas 7 and 8 to be fairly well regarded in these sections. This does not, of course, explain why this speaker rated only 13th in area 3 which includes his home region.

e. Another possible instance of preference for a locally familiar type is the speaker in 10th place. His Eastern "regional standard" speech was rated relatively higher in New York City, in area 3 (central Atlantic seaboard) and area 5 (southern Piedmont). It is interesting to observe, however, that the New England subjects did not agree on this speaker, the Worcester, Mass., group rating him higher than average, and the Orono, Maine, group rating him lower.

f. Another speaker representing the Eastern type, 15th in average rank, was rated about the same in all areas except area 5, where he is in 6th place. This more favorable rating in the Piedmont region of a colored speaker originally from Georgia again suggests the possible influence of the locally familiar type, although the speech sam-

ple in question came closer to Eastern "regional standard" than to the local variety.

g. The self-conscious attitude of New Yorkers toward New Yorkese is demonstrated by lower than average ratings for the speaker in 30th rank, who was rated 32nd by New York subjects. The other example of marked New Yorkese, in 31st rank, was also rated 31st by New Yorkers. Thus both samples of New Yorkese were rated lower than the marked foreign accent sample by New York subjects.

In general, considering the pattern of preferences as a whole, the high inter-correlations in preference between the various sections of the country, and the evidences of regional difference just enumerated, it appears that there is a slight tendency to prefer the locally prevalent type of speech, but this tendency does not apply to all speakers and seems much less important than the basically similar preferences of all areas. Either the non-dialectal factors present in our recorded speech samples so completely overshadowed any differences in dialect as to produce uniformity of preference or there are widespread attitudes toward American and foreign dialects which are reflected in the rough hierarchy of rank shown in Table III.

7. Attempts at regional identification of dialects

Item 3 of the questionnaire read: "Where do you think this type of speech is from?" Subjects were instructed to indicate their opinion by placing the number of the dialect sample on the outline map of the United States, or in one of the circles beside the map if they wished to record the judgment "foreign accent" or "don't know."

It would not require extensive research to demonstrate that the ability of the layman to identify dialects is highly inaccurate. Indeed, the tremendous popularity during the past year of a radio program featuring identification of the approximate regional background of strangers by a dialect expert indicates how unusual this ability seems to the average person. It might be, however, that the general trend of guesses by groups of untrained subjects would indicate certain facts of interest. An analysis of answers to item 3 was undertaken for 9 groups, representing 5 areas. This analysis required tabulating the individual guesses, calculating the percentage of each group which placed the speaker in each category (by states, for the United States), and finally plotting these percentage figures on the maps on blank questionnaire sheets, to show the distribution of the guesses. By this process we secured maps showing the distribution of guesses for each of the 32 dialect specimens in each of the 9 groups, or a total of

288 maps. The 9 maps for each of the 32 dialect specimens were compared, to observe the variation in patterns of guesses by the different groups of subjects. From this data an attempt was made to answer several questions. First, does the general trend of the guesses by an entire group indicate fairly accurate identification, or at least fairly close agreement? Second, which dialects were most accurately identified? Third, which dialects were least accurately identified? Finally, does there seem to be any relation between dialect preference and ease of identification?

For each of the 9 groups, in the case of almost all of the 32 dialect samples, there was wide distribution of guesses. Closest agreement occurred in the case of the extreme foreign accent sample, with about 85% recognizing the speech as foreign. Even for those American dialects where there was general agreement as to the section of the country, the guesses usually covered a large number of states.

The most accurately identified were (1) the speaker from Bombay, India; (2) the speaker from Northern England; (3) the speaker from London, England (about 60% identifying him as foreign, the majority of these indicating "British"); the speaker from Everett, Mass. (usually placed in the northeastern part of the country, although a fourth or more of the subjects from the mid-west, south and far west admitted uncertainty); and (4) the five samples of Southern speech.

None of the General American samples were thought to come from a restricted locality by any group. There is a marked tendency for groups in the several areas to identify these samples with their own state or section of the country. Time after time, however, the maps show the distribution of guesses for General American samples to be quite uniform throughout the United States. The speaker from Alaska was placed all over the United States by about half of the subjects, while about one-fourth each judged him foreign or admitted uncertainty. Likewise, the speaker with stage speech (based on general American background) could not be placed by about 25%, was judged foreign by small percentages, and was thought to be from somewhere in the northern half of the United States by the others. The two samples of extreme New Yorkese were not readily identified. The sample ranked 31st was marked "don't know" by about 25% of the subjects, and guesses were scattered throughout the United States. The sample ranked 30th was judged to be foreign by about half of the subjects, another 20 to 25% in the groups furthest removed from the east coast marking it "don't know."

It might appear from these generalizations that the more readily identifiable dialects are the least popular. Two important exceptions demonstrate the limitations of this tendency. The least readily identifiable dialect, general American, includes samples ranging in preference from 1st and 2nd place to 23rd place. Likewise, the poorly identified New Yorkese samples in 30th and 31st place rank lower than many more accurately identified samples.

CONCLUSIONS

The principal conclusions which may be drawn from these expressions of preference for various recorded dialect samples and guesses concerning the regional origin of the speakers are:

1. Speech preferences of college students in all sections of the United States are similar, and show a tendency to accept General American speech as the preferred dialect.
2. Guesses regarding the regional origin of General American speech demonstrate that it is not associated with speakers from any one section of the United States.
3. Foreign speech is rated low in comparison with samples of native American speech in proportion to its departure from American norms.
4. New York City speech tends to rate low in proportion to its noticeability in the individual speaker.
5. Pleasant voice quality and distinct articulation appear to be important factors in determining preference ratings of a given dialect sample.
6. There is some tendency for subjects to prefer the local type of speech (except in the New York metropolitan area where the opposite is true), but this tendency is much less important than the basically similar preferences of all areas.
7. The distribution of guesses regarding regional origin shows that subjects judge Southern samples to be from somewhere in the southern half of the United States, Eastern samples to be from the New England states and middle Atlantic seaboard, and foreign samples to be foreign, but individual guesses are extremely inaccurate, and on the average about twenty per cent of all subjects admit uncertainty regarding the region represented by the speaker. Neither General American speech nor New York City speech serve to identify the speaker with any particular locality.
8. To the extent that this data has any bearing on the two theories concerning preferred speech mentioned at the beginning of this article,

the results do not support the London standard theory and there is but slight support for the regional standard theory. Popular preference for General American speech or a blend of General American and Southern or Eastern has already developed much further than has been recognized by writers in this field. More widely used in the United States than any other dialect, the General American type has the additional advantages that it is favorably regarded in all sections and that it is not identified with any single region. This experiment supports the view that General American speech is likely to dominate in the trend toward a more homogeneous national language.

AN EXPERIMENTAL STUDY OF METHODS FOR DETERMINING NATURAL AND HABITUAL PITCH *

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IT has been proposed that in speech there is a pitch level, about which the pitch of the voice will vary, which is "natural" or "best" for the individual, and that this "natural" pitch level provides for the most effective usage of pitch and the other variables of voice.¹ "Natural" pitch level is to be distinguished from the "habitual" pitch level, that level which is used most frequently, and the two may or may not coincide. A factor frequently involved in voice re-training is the adjustment of the individual's habitual pitch level so that it approximates more closely his natural pitch level. It seems probable that accurate calculation of the natural pitch level will be made ultimately in terms of the anatomy and physiology of the mechanism, but present knowledge does not permit this. For this reason, various relatively simple methods of determining this level have been proposed.

Apart from the frequently appearing suggestion that various pitch levels be tried by manipulation until a suitable level can be found, there are different specific methods recommended by the literature. These specific methods locate the natural pitch level at various points in the individual's singing range, i.e., such as five notes above the lowest tone,² a musical third, i.e., two tones, below the middle note of the singing range,³ and one-third of the way

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¹ It is understood that "pitch level" does not refer to a single sound-wave frequency, but rather to a "band" of frequencies.

² Bender, J. F., and Kleinfeld, V. M., *Speech Correction Manual* (New York, 1936).

³ Aiken, W. A., *The Voice* (London, 1927). Davis, E. H., and Mammen, E. W., *The Spoken Word in Life and Art* (New York, 1935). Karr, H. M., *Your Speaking Voice* (Glendale, Calif., 1938). Mulgrave, D. I., *Speech for the Classroom Teacher* (New York, 1936). Ogg, H. L., and Immel, R. K., *Speech Improvement* (New York, 1936).

up the range from the lowest tone.⁴ Used by some clinicians are the spontaneous tone and vocalized sigh methods.⁵ It was suggested that an analysis of the voices of superior speakers might indicate the validity and reliability of the various methods, since it may be assumed that the coincidence of the habitual and natural pitch levels in these individuals will be closer than the coincidence of these levels in less superior speakers.

I. PROCEDURE

This paper presents the results of an investigation of the pitch levels and singing ranges of six adult males who were judged to have superior voices. The subjects were chosen from a group of twenty-five adult male students who were recommended for their superior voices by staff members of the Department of Speech at the State University of Iowa. A rigid test of the speaking and oral reading ability of these individuals eliminated from consideration as research subjects all who presented deviations from superior usage of voice and articulation.

The eight persons who survived this elimination read the following test passage four times:

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. *The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it.* When a man looks for something beyond his reach his friends say he is looking for a pot of gold at the end of the rainbow.⁶

⁴ Fairbanks, G., *Voice and Articulation Drillbook* (Iowa City, 1938). A revised edition of this book now presents the 25 per cent method developed in the present experiment. See same title, Harper and Bros., (New York, 1940).

⁵ To determine the spontaneous tone the individual is instructed to: "Phonate the vowel [a] at a pitch which seems most natural and easy for you. Don't try to strike any particular pitch, simply relax and phonate. Hold this tone for a few seconds." To determine the vocalized sigh the individual is instructed to: "Take a deep breath and exhale the air as a sigh. After you have exhaled a little air, begin to vocalize, sustaining the vowel [a] for a few seconds at the first pitch you strike. Relax, do not try to strike any particular pitch, but strike a pitch which seems most natural to the exhalation of air as a sigh. Be sure that you sustain the tone at the first pitch you strike." The pitch of the tones is determined by recording the musical note of the piano which matches most closely the pitch of the phonated vowel.

⁶ Only the italicized portion of the passage was studied.

Phonograph recordings of each reading were made. Before the first recording was cut, the subject was asked to read the passage silently and then to practice it aloud. Before each recording he was instructed to:

Read the passage aloud, giving the best reading you can, as if you were reading to an audience of twenty-five people. A phonograph recording will be made.

Five minutes elapsed between each recording.

The best of the four readings by each subject was selected by seven trained observers who ranked the recordings of each subject in order of general excellence. Thus, the best recording of each subject was picked for further consideration and the remainder of the recordings discarded.

The best six of these eight recordings were selected by means of the method of paired comparisons. Twelve trained observers judged whether the second recording of each pair was better or worse than the first. The pairs were presented in random order, each subject was compared twice with every other subject, and the order of comparison reversed on the second presentation of each pair. An electric reproducing system was used, and the gross loudness level was kept relatively constant. On the basis of these judgments, the six readings ranking highest were selected for further study.

- It may be assumed that these six readings are satisfactory examples of superior reading, since a fourfold selective procedure was used, viz., the preliminary consideration of twenty-five persons reputed to have superior speech, the rejection of all but eight, the selection of the best of the four recordings by each of the eight, and the final acceptance of the best six of the eight.

The pitch of a spontaneous tone and a vocalized sigh was determined for each subject by recording the musical note of the piano which most closely matched the pitch of the phonated vowel. To obtain the measures of singing ranges, each subject was instructed to sing down the scale, then up the scale, to the lowest and highest tones that could be sustained in the normal singing range. This performance was checked three times and the lowest and highest tones of the three attempts were chosen for the measures of singing range. The highest falsetto tone that could be sustained also was determined in the same manner. In order to make a rough determination of the reliability of the clinical measures of pitch, the spontaneous tone, vocalized sigh, and singing ranges were recorded on seven consecu-

tive days for two subjects and on six consecutive days for a third.

The pitches used in the reading were computed from measurements of the fundamental frequency through the phonophotographic technique of sound wave analysis.⁷

In addition to the analysis of methods for determining natural pitch, this study investigated the method for determining habitual pitch suggested by Fairbanks.⁸ By this method the individual narrows his pitch range during oral reading until he chants in a monotone. The pitch of the vowel sustained at the same pitch as the monotone should approximate the central tendency of the distribution of pitches used during the reading. A paragraph of 270 words was added to the original fifty-five word passage. Each subject read the fifty-five words as well as possible, and during the remainder of the reading attempted to narrow his range from above and below until he was chanting in a monotone. He then sustained a vowel at the same pitch as the monotone. The median pitch of the reading was determined by measurement of the fundamental frequency, and the pitch of the sustained vowel was determined by recording the note of the piano which matched it most closely.

II. RESULTS

Clinical Measures of Pitch. In order to test the clinical methods proposed for determining natural pitch level, the data presented in Table I were secured. The table presents the median pitch level and singing ranges, the relationships between these measures, and values recorded for the spontaneous tones and vocalized sighs.

The median pitch level for the group⁹ is 132.1 c.p.s.¹⁰ or about C₃¹¹ on the musical scale. The individual levels vary between 121.5 and 142.9 c.p.s., a range of 1.4 musical tones. These data substantiate the view that the male voice is pitched about one octave below

⁷ Cowan, M., "Pitch and Intensity Characteristics of Stage Speech," *Ar. Sp.*, I, Suppl. (1936). This monograph contains the most recent description of the apparatus and method of measurement.

⁸ Fairbanks, G., *Voice and Articulation Drillbook* (New York, 1940).

⁹ The pitches used by the individuals were combined to form a composite distribution for the group from which the measures were computed.

¹⁰ Cycles per second.

¹¹ The system of subscripts is that suggested by Young, R. W., *A Table Relating Frequency to Cents*, C. G. Conn Co. (Elkhart, Ind., 1939), in which the zero reference frequency of 16.35 c.p.s. proposed by Fletcher, H. "Loudness, Pitch and Timbre of Musical Tones," *J. A. S. A.*, VI (1934), 59-69, became C₀ on an A = 440 c.p.s. scale, and middle C is denoted as C₄.

middle C. In fact, the maximum difference between any subject's pitch level and C₃ is only .92 tones. It can be seen from the table that the mode pitch¹² agrees closely with the median, coinciding in four of the six cases. The mean total singing range for the group is 13.3 tones, the addition of the falsetto range raising the mean to 20.4 tones. It can be seen from Table I that the individual deviations from these means are not great. The small difference between each

TABLE I
CLINICAL MEASURES OF PITCH

	A	B	SUBJECTS		E	F	Mean
			C	D			
1. Median Pitch	131.0	136.3	142.9	138.7	121.5	125.2	132.1*
2. Nearest Musical Tone	C ₃	C# ₃	C# ₃	C# ₃	B ₂	B ₂	C ₃ *
3. Mode Pitch	C# ₃	C ₃	C# ₃	C# ₃	B ₂	B ₂	C# ₃ *
4. Lowest Sung Tone	D ₂	E ₂	E ₂	E ₂	C ₂	C ₂	
5. Highest Sung Tone	F ₄	A ₄	E ₄	E ₄	G ₄	D ₄	
6. Highest Falsetto Tone	E ₅	A# ₅	G ₅	G ₅	B ₅	E ₅	
7. Total Singing Range	13.5	14.5	12.0	12.0	15.0	13.0	13.3
8. Total Singing Range Including Falsetto	19.0	21.0	19.5	19.5	23.5	20.0	20.4
9. Difference between 1 and 4	5.0	4.4	4.8	4.5	5.4	5.7	5.0
10. Difference between 1 and 5	8.5	10.1	7.2	7.5	9.6	7.3	8.4
11. Difference between 1 and 6	14.0	16.6	14.7	15.0	18.1	14.3	15.5
12. Ratio of 9 to 7	.37	.30	.40	.38	.36	.44	.38
13. Ratio of 9 to 8	.27	.21	.25	.23	.23	.28	.25
14. Spontaneous tone	A ₂	C# ₃	C ₃	C# ₃	A ₂	A ₂	
15. Vocalized sigh	G ₃	C ₃	E ₃	C# ₃	G ₃	A# ₂	

* From group distribution of six subjects.

subject in the lowest, highest, and highest falsetto tones can be observed. These values for the total normal singing range agree closely with those reported by Wolf, Stanley, and Sette¹³ for untrained baritones.

Referring to the group values, it can be seen that the median pitch level is 5.0 tones above the lowest sustained tone, 8.5 tones below the highest normal sung tone, and 15.5 tones below the highest falsetto tone. Further reference to Table I shows that the distance of the median above the lowest tone varies less among the subjects than the distance between the median and either the highest normal or highest falsetto tones.

Row 12 of Table I expresses the fraction of the total normal

¹² The mode is the mid-point of the interval containing the greatest frequency distribution of the pitches used. An interval of one tone was employed.

¹³ Wolf, S. K., Stanley, D., and Sette, W. J., "Quantitative Studies on the Singing Voice," *J.A.S.A.* VI, (1935), 255-266.

range which lies between the median and the lowest sung tone, the mean for the six subjects being .38. Row 13 gives a similar relationship of the median to the total range including falsetto, the mean of these values being .25. It is apparent from detailed inspection of the table that individual ratios vary more in the former than in the latter measure, the ranges being .30 to .44 and .21 to .28 respectively.

Further inspection of Table I shows a tendency for the spontaneous tones and vocalized sighs to deviate from the median pitches. In two subjects, the spontaneous tones and medians coincide, but in the remainder they vary from .5 to 1.5 tones. The vocalized sigh coincides with the median in only one subject and deviates as much as 3.5 and 4.0 tones in two persons. The spontaneous tone tends to be slightly below the median, while the vocalized sigh is above the median in most instances.

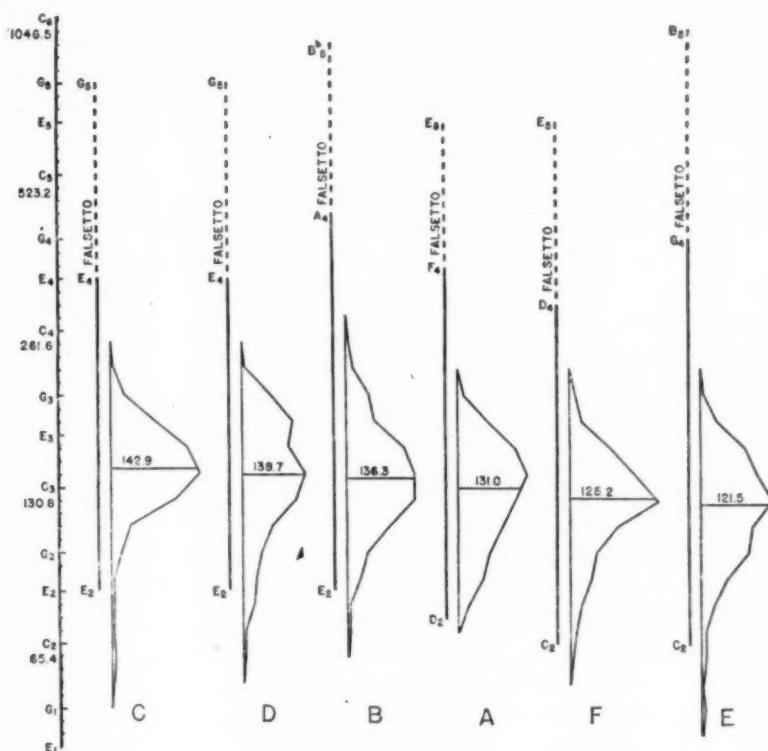
Frequency Distribution of Pitches Used. Figure 1 presents individual frequency distributions of the pitches used in the readings of the test passage, graphed in relation to the individual singing ranges. Tones of the musical scale are plotted along the ordinate. The abscissa, in the case of each subject, is the percentage of the total pitches measured. The horizontal line in each distribution indicates the median pitch, with the median frequency in cycles per second recorded above the line. Observation of the graphs shows that the distributions approximate the shape of normal curves, and that the median and mode coincide closely.

The solid vertical lines in Figure 1 indicate the total normal singing ranges; the broken lines indicate the extension of the ranges into falsetto. The tendency for the median pitch to lie approximately 25 per cent of the way up the total range including falsetto can readily be observed. The closeness with which the individual pitch levels approximate C₃ can also be seen.

Validity of Measures of Natural Pitch. Using the data presented in Table I, the natural pitches of the six superior speakers were computed by means of the clinical methods mentioned above and by means of methods derived from data obtained in the present investigation. They then were compared to the actual medians used. It will be remembered that this study is based on the assumption that, in superior speakers, the actual medians will tend to approximate the true "natural" pitch level more closely than the medians of less superior speakers.

In addition to the methods presented in the literature, the data obtained in Table I suggest that an approximation to the natural

pitch level may be a tone which lies (a) five tones above the lowest sung tone, (b) 8.5 tones below the highest tone of the normal singing range, (c) 15.5 tones below the highest falsetto tone, (d) 38 per cent of the way up the normal singing range, and (e) 25 per cent of the way up the total range including falsetto. Table II pre-



on the average. These methods also have the greatest maximum deviations. It can be seen also that these same methods predict more closely than others only 13 to 50 per cent of the time. For these reasons, they must be considered less valid than other methods.

Further consideration of the table shows that the 25 per cent, the 38 per cent, and the 5 tones methods have mean deviations less than one semitone. These methods exceed all others in predictive value by a considerable amount, predicting the medians more accurately from 70 to 72 per cent of the time. They also have the smallest

TABLE II
DEVIATIONS OF MEASURES OF NATURAL PITCH FROM MEDIANS:*

	Mean	Max.	Min.	Range	% of Closer Predictions
25% Method	.45	.84	.10	1.50	70
33% Method	.71	-1.33	.44	1.77	41
38% Method	.40	1.11	.00	1.83	72
Musical Third Method**	.61	-1.13	.10	1.98	54
3.5 Tones Method	1.46	-2.16	-.90	1.26	13
5.0 Tones Method	.39	-.66	-.03	1.26	72
8.5 Tones Method	1.03	1.60	-.03	2.87	22
15.5 Tones Method	1.32	2.61	-.52	4.34	24
Spontaneous Tone	.74	-1.52	.01	1.62	59
Vocalized Sigh	1.64	4.11	.01	4.51	50

*All values in tones, except column five.

**One musical third below middle tone.

maximum deviations. Less satisfactory are the 33.3 per cent, one musical third below the middle tone, and spontaneous tone methods, which have mean deviations between .61 and .74 tones, and predict more accurately than other methods only 41, 54, and 59 per cent of the time, respectively.

On the basis of the data of Table II, the tentative conclusion may be drawn that the 25 per cent, 38 per cent and 5 tones methods have more predictive value than other methods compared.

Reliability of Measures of Natural Pitch. In order to determine the reliability of the methods for computing natural pitch, the clinical measures described above were repeated on seven consecutive days for two of the subjects, and on six consecutive days for a third. From the data thus obtained, the deviations of the predicted pitches from the medians were computed for each of the clinical measures on each day. Table III presents the mean, minimum, maximum, and range of the deviations over the six and seven day periods for each subject. For the individuals, the mean total singing ranges were

12.9, 13.5, and 15.3 tones, and the mean total range including falsetto 18.9, 20.9, and 23.3 tones, respectively, which do not vary greatly from the mean ranges of 13.3 and 20.4 tones for the six subjects, as shown in Table I.

The relative reliability of the various methods may be observed from the range of the deviations of the predicted pitches from the natural pitches in Table III. For Subject A the most reliable methods are the spontaneous tone, 3.5 tones, 5.0 tones, 38 per cent, and 33.3 per cent methods, in that descending order. For Subject D, the 33.3 per cent and 38 per cent methods are most reliable, with the 25 per cent, one third below the middle tone, 3.5 tones and 5.0 tones methods slightly less reliable. Observation of the range of deviations for Subject E reveals that the 3.5 and 5.0 tones methods are highly reliable, and that the 25 per cent and 15.5 tones methods are relatively reliable.

Considering the three subjects, it is possible to determine the relative reliability of the methods by arranging the methods in descending rank order of the range of the deviations for the individual subjects. An average of the ranks for the three individuals indicates the relative reliability of each method for three subjects. By this means, it was found that the methods ranged from the most to the least reliable in the following order; 3.5 tones and 5.0 tones,¹⁵ 25 per cent, 33.3 per cent, 38 per cent, one musical third below the middle tone and spontaneous tone, vocalized sigh, 8.5 tones, and 15.5 tones methods. It will be noted that among the methods ranking at the top of this order are the 5 tones, 25 per cent, and 38 per cent methods which were shown above to be the most accurate for predicting natural pitch. The 3.5 tones methods was among the least valid of the methods studied, although it has high relative reliability. It will be noticed also that the 33.3 per cent and one musical third below the middle tone methods are relatively reliable and are relatively valid as shown by Table III. In fact, for the three individuals considered in the test of reliability, these latter methods are among the most valid as shown by the small deviations and high percentage of closer predictions.

From the data presented in Tables II and III, it may be concluded that the 25 per cent, 33.3 per cent, 38 per cent, one musical third below the middle tone and 5 tones methods are the most valid

¹⁵ Since both of these highest rankings are based on the same reference pitches, namely, the lowest sustained tones, they are, of course, equally reliable.

TABLE III
RELIABILITY OF MEASURES OF NATURAL PITCH
(Subject A)

	DEVIATIONS FROM MEDIAN*				% of Closer Predictions
	Min.	Max.	Range	Mean	
25% Method	-.02	-.77	1.50	.31	68
33% Method	.14	-1.03	1.17	.40	59
38% Method	.10	.77	1.13	.37	62
Musical Third Method**	.02	-1.02	1.25	.33	64
3.5 Tones Method	-.52	-1.52	1.00	1.16	21
5.0 Tones Method	-.02	.98	1.00	.36	60
8.5 Tones Method	-.02	-1.52	2.50	.65	49
15.5 Tones Method	-.02	-3.52	3.50	1.23	43
Spontaneous Tone	-.52	-1.02	.50	.88	25
Vocalized Sigh	-.02	-2.52	2.50	1.66	19

(Subject D)

	DEVIATIONS FROM MEDIAN*				% of Closer Predictions
	Min.	Max.	Range	Mean	
25% Method	.26	1.26	1.00	.72	43
33% Method	-.33	.34	.67	.19	91
38% Method	.26	1.02	.76	.64	49
Musical Third Method**	.01	.76	1.00	.33	87
3.5 Tones Method	-.99	-1.49	1.00	.99	30
5.0 Tones Method	.01	1.01	1.00	.51	54
8.5 Tones Method	-.49	1.51	2.00	.65	41
15.5 Tones Method	-.99	1.51	2.50	1.15	10
Spontaneous Tone	-.49	1.01	1.50	.72	35
Vocalized Sigh	-.49	1.51	2.00	1.08	14

(Subject E)

	DEVIATIONS FROM MEDIAN*				% of Closer Predictions
	Min.	Max.	Range	Mean	
25% Method	.39	.52	.13	.43	67
33% Method	.13	.70	.91	.38	74
38% Method	-.04	.91	.95	.45	72
Musical Third Method**	-.11	.89	1.24	.46	76
3.5 Tones Method	-1.86	-1.86	.00	1.86	24
5.0 Tones Method	-.36	-.36	.00	.36	80
8.5 Tones Method	.14	2.64	2.50	1.39	37
15.5 Tones Method	2.14	2.64	.50	2.31	7
Spontaneous Tone	.14	1.64	2.50	1.01	48
Vocalized Sigh	1.64	3.64	2.00	2.56	4

*Values in tones.

**One musical third below middle tone.

and reliable methods of the ten methods investigated for predicting natural pitch level.

Clinical Measures of Habitual Pitch. In addition to an analysis of methods for determining natural pitch, this study investigated the method for determining habitual pitch mentioned in the procedure. By this method the individual narrows his pitch range during oral reading until he chants in a monotone. The pitch of a vowel sustained at the same pitch as the monotone should approximate the median pitch used during the reading. Table IV presents a comparison of these two values. It can be seen that the difference between these two values is not great. Four of the six subjects sustained

TABLE IV
MEASURES OF HABITUAL PITCH

	A	B	SUBJECTS		E	F	Mean
			C	D			
1. Median*	146.2	128.8	157.9	130.8	129.9	116.5	
2. Nearest Musical Tone	D ₃	C ₃	D# ₃	C ₃	C ₃	A# ₂	
3. Sustained Tone	C ₃	C ₃	D# ₃	C ₃	C ₃	G# ₂	
4. Deviation of 3. from 1.**	-.98	.15	.18	.00	-.08	-1.00	.40

*Cycles per second

**Tones

tones at approximately the same pitch as the median. Two subjects sustained notes one tone lower than the median.

III. SUMMARY AND CONCLUSIONS

Standard measures of pitch were computed from phonograph recordings of the voices of six superior speakers reading a fifty-five word passage. The total normal singing ranges and the total singing ranges including falsetto also were recorded. Comparison of the median pitches used by the superior speakers with the natural pitch levels computed by ten clinical methods revealed that five methods are relatively more accurate and reliable than others, by amounts that are approximately equal. These methods are the following:

1. The 25 per cent method, which locates the natural pitch level 25 per cent of the way up the total singing range including falsetto.
2. The 33 per cent method, which locates the natural pitch level 33 per cent of the way up the total normal singing range excluding falsetto.

3. The 38 per cent method, which locates the natural pitch level 38 per cent of the way up the total normal singing range excluding falsetto.

4. The one musical third below the middle tone method, which locates the natural pitch level one musical third, i.e., two tones, below the middle note of the total normal singing range excluding falsetto.

5. The five tones method, which locates the natural pitch level five tones above the lowest sustained tone.

In these methods the predicted natural pitch was found, on the average, to deviate from the actual median by less than one tone, while a test of the reliability of these predictions on six and seven consecutive days disclosed the maximum range of deviations to be 1.5 tones.

Although the results of the study afford no means of selecting the best of these five methods, other considerations appear to indicate that the 25 per cent method is the most convenient to use. Application of the five tones method to individuals with narrow ranges is questionable. Johnson¹⁶ found that 8 per cent of the 84 college speech majors which he studied had normal singing ranges from seven to 8.5 tones. The five tones method applied to these individuals would predict natural pitch levels near the tops of their ranges. The 38 per cent method and the one musical third below the middle tone method require slightly more complicated computations than the mere division of the total range including falsetto by four. Both of these methods and the 33 per cent method, since they are based on the total normal range *excluding* falsetto, depend in part upon the determination of the highest tone of the normal range, which is considerably more difficult to determine than the highest falsetto note. Because of these considerations, the 25 per cent method of determining natural pitch level is given tentative recommendation. It should be recalled in this connection that the present study applies only to adult male speakers.

The data also show that the median pitch levels of the voices studied closely approximate C below middle C. This was true of both the habitual and natural pitch level performances which were separated by two months. The subjects of the study were judged to have superior voices, and it is probable that the pitch levels

¹⁶ Johnson, D. L. "An Analysis of the Voice and Articulation Abilities of the Students Registered in a Required Course in Speech and Dramatic Art," M. A. Thesis, State University of Iowa, 1938.

of the voices entered into the judgment of superiority. The fact that all voices used approximately the *same* pitch level suggests that there may be a general pitch level preferred for male voices and that this level is close to C below middle C. Obviously, all male voices should not be trained at this level. Individual differences in singing ranges would prohibit its use in some instances. In voice retraining, it is probable that both the individual's "natural" pitch level and the "preferred" pitch level should be considered, and that the recommended pitch level might lie between these two values, the specific pitch to be determined by experimentation.

Investigation of the method for determining habitual pitch by narrowing the range gradually until the individual chants in a monotone, and then sustaining a vowel at the same pitch as the monotone, reveals that the sustained tone tends to approximate the median pitch in superior speakers. Deviations from the median tend to be lower than the median, and did not exceed one tone in the present study. The method appears to be valid for determining the habitual pitch of superior speakers. Its use by the average speaker will depend somewhat upon his ability to narrow his range according to instructions.

DANIEL WEBSTER'S PRINCIPLES OF RHETORIC *

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I STILL LIVE!" was Daniel Webster's last coherent and intelligible utterance. Insofar as his place in the history of oratory is concerned, his last words are still true. Several studies have discussed the practices which accounted for this eminence, but no complete statement of his theory of public address, drawn from his extant comments concerning the principles of his art, has yet appeared.

HIS TRAINING

To some extent his principles were the result of his own training in rhetoric and oratory. As an adult looking back upon his "boyish performance" as a college orator and to the training which emphasized style at the expense of invention, Webster said, "I had not then learned that all true power in writing [oratorical prose] is in the idea [invention], not in the style, an error into which the *Ars rhetorica*, as it is usually taught, may easily lead stronger heads than mine."¹ What led him to form this opinion? Did he profit more from his early platform experiences than from the formal courses in rhetoric, or did he succeed in spite of all his study and practice in school? These are some questions we may attempt to answer by reviewing his training in speech.

His first instruction in speaking and reading was his father's impressive oral interpretation of the Bible. Profiting by this example, Daniel gained a local reputation for reciting verses to the teamsters who patronized his father's mill. Despite this early promise, he could not declaim when he entered Phillips Exeter Academy at the age of fourteen. Some biographers have discounted this as improbable, but Webster's "Autobiography" states that he could not "command sufficient resolution" to speak before the school because this first experience in being away from home "overpowered" him. Following each

*From a dissertation, "Daniel Webster's Theory and Practice of Public Speaking," directed by Professor L. M. Eich and submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at the University of Michigan.

¹ Webster, Daniel, "Autobiography," in *Private Correspondence of Daniel Webster*, ed. Fletcher Webster (Boston, 1857), I, 11.

humiliating experience he went to his room and "wept bitter tears of mortification."²

After leaving the Academy, he tutored in Latin under the direction of the Reverend Mr. Wood of Boscawen, New Hampshire, in order to meet the Dartmouth entrance requirement of "Cicero's Select Orations."³ He showed his interest in oratory by the zeal with which he read "Tully's denunciation of Catiline and his struggling for Milo."

This unfashionably-dressed freshman who arrived in Hanover on horseback was at once required to study Cicero's orations, rhetoric, composition, and speaking. Professor Haddock required each composition student to present ten "performances" each year, the suggested commonplaces for which were "The Pleasures and Pains of the Student," "The Discovery of Herculaneum," "The Pursuit of Fame," and "Are the Natural Abilities of the Sexes Equal?"

The rhetorical studies for sophomores included Cicero's *de Oratore*, Lord Kames' *Elements of Criticism*, Alison's "Essay on the Nature of Principles of Taste," logic, composition, and speaking. The required disputations, orations, and compositions treated commonplaces such as "Avarice," "Friendship," "Liability of Man to Err," and "Reason Productive of Happiness." This emphasis upon arrangement and felicitous phrasing was doubtless the cause of Webster's subsequent criticism of "the *Ars rhetorica*."

The third-year course included additional composition and speaking. Records of the weekly debates in which he participated in 1800 contain these questions: "Are Great Riches Conducive to Happiness?", "Which Is the More Suitable for a Wife, a Widow or an Old Maid?", "Is Familiar Intercourse between the Sexes Favorable to Virtue?", and "Does Eloquence Tend to the Investigation of Truth?" In addition to these optional debates there were required speeches. Declamations were presented in chapel each Wednesday, and the classes were called in rotation. Members of the three upper classes were called upon for orations three times per year, but no oration might be "exhibited" within four miles of Hanover until it had been "revised and approved" by someone in authority.

The seniors were required to engage in "forensic disputation"

² *Ibid.*, I, 9-10.

³ The principal sources of material on Webster's college course are (1) Foster, Herbert D., "Webster and Choate in College," *Dartmouth Alumni Magazine*, (April-May, 1927), and (2) Richardson, L. B., *History of Dartmouth College* (Hanover, N. H., 1932).

before students and teachers in compulsory chapel on the first Wednesday of each month. Further evidence of the importance of public speaking in college activities in Webster's day is shown by the Dartmouth commencement program of 1801, which lists a three-day series of events, including nine orations, one forensic dispute, and one dialogue. One of the nine orations was given by Webster on "The Influence of Opinion."

After three years of such training, Webster made one of his first off-campus appearances as a Fourth of July orator in Hanover. Some of his friends thought so well of the speech that they secured copies for the press. But when a copy came to the attention of Joseph Dennie, the editor of a literary paper in Walpole, New Hampshire, he wrote a scathing review, calling the oration "ridiculous" and "a fungus of uncommon magnitude." He quoted "one of the many instances" of bad taste as follows:

Oxford and Cambridge, those oriental Stars of literature, shall now be lost while the bright sun of American science displays his broad circumference in un eclipsed radiance.⁴

Fifty years after this review appeared, Webster admitted to Professor Felton of Harvard that Dennie's criticism had been a major influence upon his style. Believing that the criticism was just, and realizing that a lawyer had to earn his living by "addressing the understanding of common men," Webster applied himself systematically to the task of reforming his style.⁵

The second major influence upon his style was exerted by Jeremiah Mason, who was Webster's ablest rival on the Portsmouth circuit from 1807 to 1816. After hearing Mason in court, Webster deliberately changed his style of speaking; instead of retaining his former florid and "vicious" style which was characterized by "long sentences and large words," he tried to emulate Mason's plain, conversational style.⁶

Many lesser sources of influence upon his style are observable in his correspondence and in the catalogue of his private library.⁷ These materials show that he continued his study of rhetoric and oratory beyond his college career. For instance, he memorized Ames'

⁴ *Farmer's Museum, or Literary Gazette* (July 21, 1800), "Incidents at Home."

⁵ Felton, C. C., "Daniel Webster," *American Whig Review*, New Series, X (1852), 483.

⁶ Curtis, George T., *Life of Daniel Webster* (New York, 1870), I, 90.

⁷ *Catalogue of the Private Library of the Late Daniel Webster* . . . (Boston, 1853).

speech on the British treaty and passages from Cicero's orations, after which he wrote a commentary upon Whately's *Elements of Rhetoric*. Among the rhetorical works in his library were those of Whately and Cicero, Kirkham's *Elocution*, and Walker's *Elocution*. The many volumes of speeches included the works of J. Q. Adams, J. Appleton, Chatham, Burke, Cicero, J. Codman, Erskine, Everett, Fox, D. Osgood, Sheridan, and Pitt. His collection also included sets of volumes containing speeches given in Congress, in Parliament, and on important public occasions.

In answer to the previous questions concerning the quality of Webster's training in speech and its effect on the formulation of his own principles, these statements seem justified: (1) his college courses and platform experiences were helpful in that they gave him a grasp of classical principles and proficiency in terms of poise, confidence, skill in argument, and a feeling for words; (2) these courses in rhetoric were harmful in that the written exercises stressed felicitous phrasing rather than significance of ideas, and the platform work apparently did not emphasize directness in delivery and style; (3) the principal factors which produced his guiding principles were his knowledge of rhetoric, the development of his judgment, and his cultivated ability to profit from criticism and observation.

PRINCIPLES OF RHETORIC

... I have observed something of the effect of speaking and writing, and have endeavored to analyze "the causes of effects." "After all," says Cobbett, "he is a man of talent that can make a thing move." And after all, say I, he is an orator that can make me think as he thinks, and feel as he feels.⁸

Since Webster sought to analyze "the causes of effects" in oratory, it may be interesting to observe the results of his analysis. As his remarks concerning rhetoric are widely scattered throughout his letters, "Autobiography," "Diary," published interviews, and speeches, it is desirable to group them under convenient headings such as the constituents of classical rhetoric. It is only natural that these should serve as a framework, because he learned them from the study of Cicero, who was his favorite orator and rhetorician.

Invention

Invention, including topics, general and specific preparation, and ethical, logical, and emotional proofs, apparently was Webster's major interest in rhetoric. This conclusion is based upon two facts,

⁸ *Private Correspondence*, I, 465.

his previously quoted statement that ideas are more important than style and the comparatively numerous pronouncements on invention.

Topics. Paraphrasing Webster, we may say he believed that topics should be (1) timely and appropriate to the subject and the occasion, (2) interesting to the audience, (3) simple and constituent elements of a subject, (4) temperate, cautious, and national in debates, and (5) based upon praise and blame in political campaigns. In making the point that a speaker's topics ought to be timely and appropriate to the subject and the occasion, Webster called it "aside from good taste" if a speaker discusses topics other than those on which he was asked to speak, or if he deviates from "pure rhetorical taste" by using extraneous material.⁹ As an example, the ideas in "The Reply to Hayne" were well received, he said, because "the times favored their impression."¹⁰ Closely related to this principle was his view that topics ought to be chosen on the basis of audience interest. He criticized other speakers' hackneyed topics, such as those on political economy, for he believed it difficult to speak interestingly on them.¹¹ But he used them extensively in his own speeches on tariff, banking, currency, and taxation. Pointing out that it was "... always the work of a master mind to find the simple and constituent elements of things, that were to all appearance and to common minds intricate and perplexed,"¹² Webster complimented Samuel Dexter and Jeremiah Mason for their use of topics based upon simple elements. Because of his topics, Dexter's "very statement was argument; his inference seemed demonstration."¹³ Webster also advised speakers on controversial subjects to use "temperate, cautious, and national" topics rather than "intemperate or sectional" ideas.¹⁴ This apparently was one of his basic opinions concerning topical invention, since he stated it in connection with debates on tariff, internal improvements, and the Compromise of 1850. In advising political campaigners to contrast themselves and their opponents, Webster expressed the Aristotelian topic of praise and blame in this way: "Expose the selfishness and pretence of the men in power, as

⁹ Stuart, Moses, *Mr. Webster's Andover Address . . .* (Essex County, 1844), pp. 6-7.

¹⁰ Webster, Daniel, *The Writings and Speeches of Daniel Webster* (Boston, 1903), XVI, 194.

¹¹ *Private Correspondence*, I, 501.

¹² Stuart, *op. cit.*, p. 8.

¹³ Webster, Daniel, *op. cit.*, VI, 62.

¹⁴ *Private Correspondence*, I, 492-493.

much as possible Show ourselves uniform and just, by acting according to our principles" ¹⁵

In addition to expressing five principles of topical invention, he carried his practical views to the extreme of recommending three specific speech topics: the Revolution,¹⁶ the Union, and the Constitution.¹⁷ Even had he made no statement about this matter, his predilection would be evident from his own practice.

Ethical Proof. Like some of the classical rhetoricians, Webster regarded the general competence of the speaker as the central point in a speech situation; he named "the man" as the first of three sources of "true eloquence."¹⁸ The personal qualities which he desired in speakers were intelligence, common sense, broad learning, good health, sincerity, broad-mindedness, respectability, dignity, and ability to defend causes and to lead men. Speaking of the ethical effect of mental ability, he stressed the importance of "clear thoughts," "good sense," "understanding," and "a strong, generalizing, and capacious mind."¹⁹ Advising his son to "cultivate liberal knowledge . . . if not for use, yet for effect," Webster explained the ethical effect of apparent learning:

If, on a given occasion, a man can, gracefully, and without the air of a pedant, show a little more knowledge than the occasion requires, the world will give him credit for eminent attainments. It is an honest quackery²⁰

Moreover, good health or "a sound body" is often as significant as intellect in the total picture of a speaker's general competence, according to Webster.²¹ He included sincerity as a desirable, personal quality, saying, "Out of the abundance of the heart the mouth speaketh."²² Because frankness and sincerity enable a speaker to hold attention, inspire confidence, produce conviction, and become a more able leader of men, Webster reasoned, it follows that John Adams' earnestness was one of three "qualities which produce conviction."²³ Furthermore, one who exerts such leadership through speech ought

¹⁵ *Ibid.*

¹⁶ *Writings and Speeches*, XVI, 256.

¹⁷ *Ibid.*, VI, 62.

¹⁸ *Ibid.*, I, 307.

¹⁹ *Ibid.*, VI, 62; *Private Correspondence*, I, 184.

²⁰ *Private Correspondence*, II, 16.

²¹ *Ibid.*, I, 397.

²² *National Intelligencer* (Washington, June 30, 1853).

²³ *Writings and Speeches*, I, 307.

to be broadminded and unselfish, as were Clay,²⁴ Harvey,²⁵ and Bates.²⁶ Defeated minority leaders, he continued, might profitably cultivate these qualities and avoid mere "snarling and grumbling."²⁷ Closely related to these attributes is the "power to defend, and capacity to lead," as Webster said of Clay.²⁸ In this he meant more than "boldness" in debate; he insisted upon the use of ample proof, as is shown by his disgust with opponents who could not prove him "wrong in law, wrong in fact or guilty of inconsistency,"²⁹ Another necessary personal quality, especially in lawyers and public men, is respectability or "excellent private character"; Webster called these as important as the amount of one's professional business.³⁰ Applying this tenet to an opponent, Webster praised Hayne's "perfect integrity" and "fidelity to the discharge of his duties."³¹ Finally, Webster listed "dignity" or "decorum" as a personal quality which accounted in part for the success of certain contemporary speakers.³²

He held that ethical proof is more than a matter of certain personal qualities; he thought of it in terms of several specific practices or techniques, such as speaking briefly, choosing occasions wisely, discussing issues rather than personalities, and putting forth one's case rather than one's self. Impressed favorably by the brevity of speeches given by lawyers and public men whom he heard in England in 1839, he recommended the custom to his American colleagues, asserting it to be a mark of superior training to use no superfluous words or arguments.³³ Nor did Webster omit advice on the choice of speaking occasions. He, who was forever conscious of his reputation as a speaker as well as sensitive to immediate effect upon audiences, believed it wise to avoid frequent appearances, involvement in protracted debates, and speaking on trivial social occasions. As Webster said, a speaker's effectiveness suffers if he

²⁴ Webster, Daniel, "Mr. Clay," *American Monthly Magazine* (August, 1829), p. 12.

²⁵ *Private Correspondence*, II, 327.

²⁶ *Writings and Speeches*, XIV, 288.

²⁷ *Ibid.*, XVI, 474.

²⁸ Webster, "Mr. Clay," p. 12.

²⁹ *Writings and Speeches*, XVI, 546.

³⁰ *Private Correspondence*, I, 163-164 and 184.

³¹ *Writings and Speeches*, XVI, 316.

³² *Ibid.*, I, 307; Van Tyne, Claude H., *The Letters of Daniel Webster* (New York, 1902), p. 615.

³³ Harvey, Peter, *Reminiscences and Anecdotes of Daniel Webster* (Boston, 1877), pp. 258-259.

"transgresses on propriety for the sake of talking,"³⁴ if he "falls into the middle of a procession of speakers,"³⁵ or if he acquires a reputation as a "mere table orator."³⁶ Another practice which Webster deplored during the Jackson administration was the "personal rancor" which put our democracy to "torture";³⁷ he preferred the display of "excellent temper, politeness, and mutual respect among the speakers" in Parliament.³⁸ Furthermore, he so firmly believed that principles are permanently necessary to a country, while men are transitory and dispensable,³⁹ that he defiantly announced, "I war with principles, and not with men."⁴⁰ Lastly, he desired that speakers unobtrusively communicate their arguments rather than indulge in personal exhibitionism; he cited the eloquent Senator Bates as one who was natural, simple, and unobtrusive.⁴¹

Logical Proof. To Webster, the logical mode of persuasion was not a system of induction and deduction in the classical sense; it was a matter of effective argument as judged by speakers and listeners. Expressing his interest in the logical processes of argument, he said, "The highest enjoyment, almost, which I have in life, is in hearing an able argument or speech. The development of *mind* in those modes, is delightful."⁴²

In addition to expressing a general interest in able argument, he stated five desirable qualities: deep and clear analysis, clearness of inference, cleverness, close reasoning, and consistency. He admired speakers who exhibited a "deep and clear analysis" and "mighty grasp of principle";⁴³ in fact, to be able to see the essence of a problem and to present it clearly was to him a touchstone of excellence in speaking. Thus, to Webster, careful analysis and clear understanding were more important than logical deductions.⁴⁴ He did not deny the value of the ability to draw clear or self-evident inferences; indeed, he attributed some of Mr. Bates' success as a

³⁴ *Private Correspondence*, II, 58-59.

³⁵ *Writings and Speeches*, XVI, 492.

³⁶ Webster, "Mr. Clay," p. 12.

³⁷ *Private Correspondence*, II, 132.

³⁸ *Ibid.*, p. 51.

³⁹ *National Gazette* (Philadelphia, November 28, 1834).

⁴⁰ Harvey, *op. cit.*, p. 336.

⁴¹ *Writings and Speeches*, XIV, 288.

⁴² *Ibid.*, XVI, 95.

⁴³ *Private Correspondence*, I, 184.

⁴⁴ *Writings and Speeches*, I, 307-308.

jury pleader to that ability.⁴⁵ Cautioning against sacrificing clarity of inference for depth of thought, he pointed out that St. Paul's injunctions are clear "notwithstanding he sometimes argues so deeply, and even critically."⁴⁶ Upon observing the successful practices of certain Congressmen and lawyers, Webster concluded that it was good strategy to invent "ingenious and subtle"⁴⁷ or "shrewd and dextrous"⁴⁸ arguments which an opponent would not anticipate. In addition, he believed that arguments should be closely reasoned and consistent with each other. "Closeness of logic," as he phrased it, was a source of power in Calhoun⁴⁹ and Otis,⁵⁰ while Kossuth's lack of it reduced his effectiveness.⁵¹ Speaking of Mr. Parson's prowess in debate, Webster wrote, "His argument is, therefore, always consistent with itself; and its course so luminous that you are ready to wonder why any one should hesitate to follow him."⁵²

Pathetic Proof. Webster offered few germane suggestions on the pathetic mode of persuasion, which here includes emotional appeals and audience analysis. He specified "truth" or reasonable probability as the one indispensable basis of all emotional appeals.⁵³

His pronouncements about audience analysis concern individual differences, attention, attitudes, and hints to lawyers and preachers. Recognizing the obvious fact of individual differences, he listed "who is spoken to" as one of three bases of successful argument;⁵⁴ and he quoted approvingly Quintilian's views on personality types.⁵⁵ In the related field of attention, Webster expressed both the speaker's and the listener's viewpoints: as a listener, he wished a speaker to arouse interest and to measure it by observing his audience;⁵⁶ as a speaker, he felt that close attention was the best compliment he could receive. He also believed that a speaker ought to discover the dominant audience attitudes and adapt his remarks to them, not only in terms of ideas but also in terms of delivery.⁵⁷ Because he dis-

⁴⁵ *Ibid.*, XIV, 288.

⁴⁶ *Private Correspondence*, II, 412.

⁴⁷ *Ibid.*, p. 5.

⁴⁸ *Ibid.*, I, 179.

⁴⁹ Curtis, *op. cit.*, II, 435.

⁵⁰ *Writings and Speeches*, I, 297.

⁵¹ Felton, *op. cit.*, p. 483.

⁵² *Private Correspondence*, I, 183.

⁵³ *Writings and Speeches*, XV, 444.

⁵⁴ *Private Correspondence*, II, 4.

⁵⁵ *Writings and Speeches*, IV, 181.

⁵⁶ *Ibid.*, XVI, 97.

⁵⁷ Stuart, *op. cit.*, pp. 5-6.

liked generalized appeals from the pulpit, he urged that preachers make their sermons "a personal matter" by adapting to their listeners' needs.⁵⁸ Turning to his own profession, Webster pointed out that a jury pleader must observe his jurors' reactions and adapt his material accordingly.⁵⁹

General Preparation. Webster's opinions concerning general preparation dealt with the accumulation of a background of experience from five sources: persons, studies, religion, solitary communion with nature, and travel. Apparently he considered informed persons as the most fruitful source, because he called conversation the greatest source of knowledge;⁶⁰ then too, he spoke of "companionship with educated and respectable gentlemen" as one of four "elements of a happy New England village."⁶¹

With reference to studies as a source of general preparation, he mentioned the value of education, the necessity of ambition and correct study habits, the importance of liberal knowledge, and the limitations of political economy as a field of study. Educational opportunities had meant so much to him in terms of "knowledge, respectability, and self-protection" that he expressed "the deepest conviction of the utility and necessity of popular Education."⁶² His appreciation of education also led him to urge students to make the most of their opportunities: ". . . contract a habit of diligent study . . . Be emulous of excellence."⁶³ In his opinion, Jeremiah Mason exemplified Quintilian's principle that ambition is the most essential trait of a student.⁶⁴ The best way to study law or history, Webster explained, is to associate the material with some particular point, event, or date; and since one cannot "keep the mind on the stretch forever," he advocated occasional relaxation in the "cheerfulness and joy" of society.⁶⁵ He was allowing for a human frailty rather than scoffing at scholarship when he said the appearance of knowledge is sometimes as useful as knowledge itself.⁶⁶ His genuine

⁵⁸ Harvey, *op. cit.*, p. 400.

⁵⁹ *Private Correspondence*, I, 183.

⁶⁰ Hoar, George F., ed., *Charles Sumner: His Complete Works* (Boston, 1900), XVIII, 109.

⁶¹ *Private Correspondence*, II, 147.

⁶² Van Tyne, Claude, ed., *The Letters of Daniel Webster* (New York, 1902), p. 696.

⁶³ *Private Correspondence*, II, 40-41.

⁶⁴ *Writings and Speeches*, IV, 181.

⁶⁵ *Private Correspondence*, I, 127.

⁶⁶ *Ibid.*, I, p. 146.

interest in liberal education is apparent in his advice to his son to "cultivate liberal knowledge,"⁶⁷ and in his recommendation that law students learn enough French, Latin, Greek, and general literature to gain a "liberal knowledge" of ideas which are a speaker's "diet."⁶⁸ Because Adams and Jefferson did this, he reasoned, "... their acquisitions in literature furnished resources, promptitude, facility, wide field for analogy and illustration, larger view and broader range on every subject for discussion" ⁶⁹ Surprising as it may seem in view of Webster's extensive use of political economy, he said this subject could not be called a science because it consisted of "mere truisms and doubtful propositions."⁷⁰

Webster apparently regarded religion, solitary communion with nature, and travel as minor sources of general preparation, at least in so far as speakers *per se* are concerned. Speaking in general terms of the first of these three, he said, "Religion, therefore, is a necessary and indispensable element in any great human character. There is no living without it."⁷¹ His only reference to religious sources of speech material was his assertion that the Bible is for lawyers as well as for divines.⁷² Recommending "occasional solitude to hold communion with nature" as a source of general preparation, he continued, "And when *thinking* is to be done, one must of course be alone. No man knows *himself* who does not thus, sometimes, keep his own company."⁷³ Granting that books often supply new ideas, he added that a visit to new scenes and new circles often does the same thing effectually.⁷⁴ Again referring to travel as a cultural experience, he advised students to broaden their knowledge through travel before settling in professions.⁷⁵

Specific Preparation. During the height of Webster's career as a speaker, it was a current belief that he relied on inspiration rather than specific preparation for some of his celebrated speeches. In reply to a friend who asked if this were true, Webster said, "No man is inspired with the occasion; I never was."⁷⁶ In addition to

⁶⁷ *Ibid.*, II, 16.

⁶⁸ Van Tyne, *op. cit.*, p. 738.

⁶⁹ *Writings and Speeches*, I, 318-320.

⁷⁰ *Private Correspondence*, I, 501.

⁷¹ *Writings and Speeches*, IV, 188.

⁷² Lanman, Charles, *The Private Life of Daniel Webster* (New York, 1852), pp. 103-104.

⁷³ *Private Correspondence*, I, 15.

⁷⁴ Van Tyne, *op. cit.*, p. 738.

⁷⁵ *Private Correspondence*, I, 261.

⁷⁶ Harvey, *op. cit.*, pp. 151-152.

stressing the necessity of specific preparation, he offered advice pertaining to the time and steps involved. As might be expected in view of his concern with reputation and immediate effect, he thought that the importance of the occasion and the available time ought to determine the extent of one's preparation; in short, he wanted speakers to live up to public expectations.⁷⁷ One sure way to effect this result, he wrote, is to make "profound and philosophical investigation" before writing an essay or a speech.⁷⁸ He evidently made a distinction between young orators and experienced speakers when referring to further preparatory steps: a young orator should write, polish, memorize, and rehearse his oration for an important occasion; ⁷⁹ a more experienced person, such as a Congressman, need only write his speech beforehand.⁸⁰

Arrangement

With reference to rhetorical arrangement, Webster expressed five precepts, most of which dealt with strategy. In general, speeches must be "systematic and coherent," because "wanderings" are a waste of time.⁸¹ More specifically, he believed that the disposition of topics should be made on the basis of audience attitudes.⁸² This principle was pivotal, because it governed the application of the next two, namely, that a speaker must "hasten into the middle of the matter" with a favorable audience,⁸³ but that he ought to place weak arguments between strong ones if his audience were doubtful or unfavorable.⁸⁴ Lastly, if a speaker wants to make an immediate, favorable impression upon his audience, he must set forth his issues, principles, and laws early in the speech, Webster pointed out.⁸⁵

Style

Evaluating the importance of style, he deemed it less significant than invention; he believed, however, that speakers have some responsibility for the language habits of the public and that posterity

⁷⁷ *Private Correspondence*, I, 538.

⁷⁸ Van Tyne, *op. cit.*, p. 698.

⁷⁹ *Private Correspondence*, I, 538.

⁸⁰ Winthrop, Robert C., "Webster's Reply to Hayne, and His General Methods of Preparation," *Scribner's Magazine*, XV (January, 1894), p. 123.

⁸¹ *Private Correspondence*, I, 428.

⁸² Stuart, *op. cit.*, p. 9.

⁸³ *Private Correspondence*, II, 143.

⁸⁴ *Ibid.*, I, 183.

⁸⁵ *Writings and Speeches*, XVI, 200.

will judge a speaker by his style. In his celebrated eulogy of Adams and Jefferson, he ridiculed the use of mere stylistic rhetoric on momentous occasions, saying that studied contrivances of speech shock and disgust men when great issues are at stake. In his opinion, ornate rhetoric should be employed only on ceremonial occasions which call for display.⁸⁶ He emphasized the importance of style again during the bitter controversy occasioned by the Compromise of 1850: "... the vernacular tongue of the country has become greatly vitiated, depraved, and corrupted by the style of our Congressional debates."⁸⁷ Because he thought that posterity would judge speeches on the basis of style, he advised his associate in the Dartmouth College Case to compose carefully those speeches which might be printed.⁸⁸ Here again, he was thinking of effect and reputation in terms of the future as well as the present.

His widely scattered remarks dealing with the qualities of good style stress plainness, energy, terseness, clearness, beauty, appropriateness, and individuality. To Webster, plainness was the mean between floridity and severity; he thought one should be able to speak interestingly without making obvious attempts at brilliancy.⁸⁹ On this ground he regarded his own early speeches as "florid and vicious," but he condemned equally the other extreme, the "severe" style.⁹⁰ Agreeing with Whately's emphasis upon energy of style,⁹¹ he demanded that energy be "strong without rage," meaning that it should be used moderately.⁹² Disdainful of prolixity, Webster wrote to a friend: "But you know there are folks whose words are in inverse proportion to the ideas they convey."⁹³ Thus, except for ceremonial oratory, he favored Calhoun's "terse, condensed, concise" style, which to him was the opposite of verbosity and "emptiness" of thought.⁹⁴ Endorsing Whately's treatment of perspicuity,⁹⁵ he listed clearness as one of three qualities which produce conviction,⁹⁶ but he insisted that it need not be sacrificed for depth of thought.⁹⁷ Again citing

⁸⁶ *Ibid.*, I, 307.

⁸⁷ *Ibid.*, X, 90.

⁸⁸ *Ibid.*, XVI, 47.

⁸⁹ Harvey, *op. cit.*, pp. 258-259.

⁹⁰ *Private Correspondence*, I, 538.

⁹¹ *Ibid.*, pp. 463-465.

⁹² *Ibid.*, II, 111.

⁹³ *Ibid.*, I, 119.

⁹⁴ *Writings and Speeches*, X, 101.

⁹⁵ *Private Correspondence*, I, 463-465.

⁹⁶ *Writings and Speeches*, I, 307.

⁹⁷ *Private Correspondence*, II, 111.

Whately, Webster agreed that beauty of oral style is achieved by correct and elegant language, which he defined as the avoidance of long sentences, difficult words, grammatical errors, and bad taste in general.⁹⁸ In his opinion, appropriateness was a matter of adapting the style to the particular kind of speech; specifically, he advised against the use of poetic imagery or Ciceronian style in a "forensic or didactic speech,"⁹⁹ but conversely, he did not object to the use of ornament in occasional addresses. Speaking of Adams' eloquence, Webster said it "resembled his general character, and formed, indeed, a part of it."¹⁰⁰ He restated his view that style is an expression of individuality in his evaluation of the forensic speaking of Mr. Dexter and Mr. Parsons of Boston, both of whom he called successful. Parsons began with common maxims, clarifying each step in his argument, while Dexter began with complex arguments which he did not clarify until the end.¹⁰¹

Paraphrasing Webster's remarks concerning the ways to achieve good style, we may state eight principles: (1) read "the best authors," such as Addison, Shakespeare, Milton, and the Bible;¹⁰² (2) use pronouns in the first person,¹⁰³ plain, Saxon words, and appropriate adjectives to add definiteness to ideas, as in the sentence, "The murderer stood by the side of the slain, his sandals wet with the blood, the warm, gushing blood of his victim";¹⁰⁴ (3) employ repetition only when it adds vividness and thereby heightens the persuasive force of an argument; (4) particularize details in "pathetic description" and narration to sharpen the impression; (5) generalize in order to make a forceful summation of details;¹⁰⁵ (6) in the interest of beauty of style, use only materials which are "true" or reasonably probable, for "nothing is beautiful which is not true;"¹⁰⁶ (7) use "happy and convincing illustrations," which help to make a speaker "eminent and successful,"¹⁰⁷ and, in fact, are indispensable;¹⁰⁸ (8) revise speeches for delivery or for printing, because "it is with our

⁹⁸ *Ibid.*; Van Tyne, *op. cit.*, p. 698.

⁹⁹ Stuart, *op. cit.*, p. 9.

¹⁰⁰ *Writings and Speeches*, I, 307.

¹⁰¹ *Private Correspondence*, I, 184.

¹⁰² Felton, *op. cit.*, p. 483.

¹⁰³ *Private Correspondence*, II, 482-483.

¹⁰⁴ *Ibid.*, I, 463.

¹⁰⁵ *Ibid.*

¹⁰⁶ Van Tyne, *op. cit.*, p. 77; *Writings and Speeches*, II, 38.

¹⁰⁷ *Writings and Speeches*, XIV, 288.

¹⁰⁸ *Private Correspondence*, II, 443.

thoughts as with our persons—their intrinsic value is mostly undervalued, unless outwardly expressed in an attractive garb.”¹⁰⁹

Delivery

In connection with this constituent, which Webster discussed less extensively than he did invention and style, he said most about the general qualities, somewhat less about the visible elements, still less about the modes, and least about voice. He did not evaluate the relative importance of delivery, but he included it in his criticisms of speakers.

His opinion concerning the general qualities was essentially this: a speaker's manner of delivery is an important factor in holding attention; it should be energetic but not vehement; a speaker should “warm up” to his climax; he should be pleasant and fluent. In order to illustrate the relationship of delivery to attention, Webster said that Clay's delivery enabled him to hold attention longer than anyone in Congress.¹¹⁰ As a method of securing energy without vehemence, Webster suggested a gradual approach to a climax instead of beginning “all on fire and bursting with zeal.”¹¹¹ He recommended, in addition to moderate energy, the qualities of pleasantness and fluency, adding that Americans excelled Englishmen in this respect.¹¹²

In his remarks about the visible aspects of delivery, he included appearance, hand and arm movements, and facial expression. To him, appearance was “a general air and appearance such as prepossesses and strikes the audience.”¹¹³

He said little directly about gestures in the sense of hand and arm movements; his only extant comments deal with the “ease and natural effect” which should be achieved.¹¹⁴ On facial expression and total bodily action, he was more explicit; he delighted in hearing a good speech, he said, because “In the living speaker, we see the thought itself, as it rises in the speaker's own mind. And his countenance often indicates a *perception* before it gets upon his tongue.”¹¹⁵ His conception of gesture as total bodily action is shown in his tribute to Adams' eloquence, in which he described the speaker's

¹⁰⁹ *Writings and Speeches*, XIII, 564.

¹¹⁰ Webster, “Mr. Clay,” p. 12.

¹¹¹ Stuart, *op. cit.*, p. 5.

¹¹² *Writings and Speeches*, XVI, 313.

¹¹³ Webster, “Mr. Clay,” p. 11.

¹¹⁴ *Private Correspondence*, I, 241.

¹¹⁵ *Writings and Speeches*, XVI, 95.

ideas and spirit as being observable in the voice, the eyes, the features, and the whole man.¹¹⁶

In discussing modes of delivery, Webster again suggested his pervasive principle of appropriateness, saying that occasional addresses might be delivered from memory, whereas, "declamation and fine speaking" are out of place in forensic speeches.¹¹⁷ All available evidence indicates that he left few statements about the vocal elements in speech, but his published article on Clay shows that he included force, range, quality, and modulation as desirable characteristics.¹¹⁸

SUMMARY AND CONCLUSIONS

Possibly the first item of interest in connection with the subject of this study is the fact that Webster did express definite opinions concerning the principles of his art. True, he did not compose a systematic treatise on rhetoric, but on many occasions he made pertinent comments which, when assembled and classified, fairly represent the principles which he found useful.

To those who are conversant with the history of rhetoric, one of the interesting characteristics of Webster's expressed principles is their classical flavor. This characteristic is observable in his emphasis upon invention, especially ethical proof, general preparation, and topics; he discussed this constituent more extensively than he did the other three combined. Furthermore, he followed the best classical tradition in emphasizing the "good man" ideal and in thinking of the speaker's personality as the central point in a speech situation. In theory, as well as in practice, Webster was significantly influenced by Cicero.

The typically Websterian predilection for the pragmatic as opposed to the speculative is apparent in his expressed principles of rhetoric. As has been shown, he "observed something of the effect of speaking and writing," and he "endeavored to analyze 'the causes of effects'." Then too, he frequently mentioned instances in which certain principles had been used successfully; he was interested in only those rhetorical principles which "worked." As we have seen, he became critical of his college training when he realized that some of his acquired principles and practices failed in real life situations.

Did Webster follow these principles consistently in his own practice? Space limitations do not permit the arraying of sufficient evi-

¹¹⁶ *Ibid.*, I, 307.

¹¹⁷ *Private Correspondence*, I, 538 and 275.

¹¹⁸ Webster, "Mr. Clay," pp. 11-12.

dence to justify a definitive statement here, but the question of the correspondence of his theory and his practice is discussed at length elsewhere.¹¹⁹ In the writer's opinion, Webster's expressed principles were, for the most part, functional in his own practice, with the possible exception of these instances: in the tariff debate of 1828 and in the Compromise struggle of 1850, some persons questioned his sincerity; in matters of personal finance and presidential aspirations, his unselfishness was open to question; in legislative assemblies his "capacity to lead" was less than his "power to defend"; in occasional addresses, which he considered "display pieces," his manner was not unobtrusive; in some quarters, especially as a result of Abolitionist propaganda, his "respectability as a man" was thought to be inferior to his expressed ideal.

It is not maintained that Webster's theory is more fruitful than his practice as a field of study; it is probable that he will continue to live in history as a politician, statesman, lawyer, orator, and economist. But his pre-eminence as an orator, and the significant correspondence, at most points, between his practice and theory, make his rhetorical principles of more than passing interest to students of public address.

¹¹⁹ Mills, Glen E., "Daniel Webster's Theory and Practice of Public Speaking," Ph.D. Dissertation, University of Michigan, 1941.

SOCIAL FEARS AS REPORTED BY STUDENTS IN COLLEGE SPEECH CLASSES *

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IN the performance of his usual duties the teacher of speech has before him a passing parade of students who adjust themselves with marked individual differences in the degree of fear and confidence with which they confront their classmates. No one can seriously doubt the genuineness of the students' anxieties and satisfactions in that situation, and the speech class is therefore a good laboratory for the study of certain types of social experience which are of universal interest and also of importance in the teaching of speech.

Despite the excellent opportunities for the study of social fears among college speech students, not a great deal of experimental work has been done. Lomas¹ secured ratings on nervous behavior and introspective reports from one hundred and sixteen tenth grade students. He found a decrease in reported stage fright over a period of time, although the introduction of novel features in the speech situation toward the end of the training period seemed to cause some regression. Waggoner² used galvanometric readings in comparing the bodily disturbances of superior and inferior speakers. Hayworth³ employed an adaptation of the graphic rating scale in studying the relative effectiveness of different ways of treating stage fright. Some of the tests which have been used in the study of relationships between speech and personality,⁴ and certain forms which were developed with special reference to speech behavior⁵ contain items

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¹ Lomas, Charles W., "A Study of Stage Fright as Measured by Student Reactions," M.A. Thesis, Northwestern University, 1934.

² Waggoner, Janice, "A Comparative Galvanometric Study of Inferior and Superior Speakers," M.A. Thesis, University of Denver, 1933.

³ *A Research Into the Teaching of Speech*, Donald Hayworth, Ed., Published by the National Association of Teachers of Speech.

⁴ Gilkinson, Howard, and Knower, Franklin, "A Study of Standardized Personality Tests and Skill in Speech," *Journal of Educational Psychology*, XXXII (1941), 161-175.

⁵ Knower, Franklin, "A Study of Speech Attitudes and Adjustments," SM, V (1938), 130-203; Miller, Lawrence, and Murray, Elwood, *Personal-Social Adjustment Test* (Denver, Colo., 1939).

which may reflect the subject's fear or confidence in the presence of an audience. These special forms are, however, rather broad in their implications and canvass the subject's reactions to a wide variety of social situations.

The present investigation was begun in the spring of 1941 with two general purposes in view:

1. To develop a method of securing reports from students on the emotions which they experience in speaking before their classmates.
2. To study the association and correlation of these reports with data relative to such factors as speech skill, academic achievement, age, experience, training, physical status, fears and sensitivities, and morale.

This article deals mainly with the procedures and results of those parts of the study which were carried out in furtherance of the first of these two purposes.

THE DIRECT REPORT

In order to carry out an investigation of social fears it was necessary to develop some forms and procedures through which the students could describe their experiences. The *PERSONAL REPORT ON CONFIDENCE AS A SPEAKER* was drawn up for preliminary trial. It will be noted that three different types of material are included:

- a. *Graphic Rating Scales.* Two are provided. On the first the subject indicates the feelings experienced just before and at the beginning of a talk before his classmates; on the second he indicates the feelings experienced during the rest of the talk. Two scales were included on the assumption that the experience of anticipation would differ from that of actually speaking.
- b. *Check List of Descriptive Terms.* There are twenty-two terms which the subject can check as descriptive of his experiences before and during his talk.
- c. *List of Descriptive Statements.* One hundred and four statements were included in this part of the form. The first fifty-four were intended to reflect varying degrees of fear, and the remaining fifty were intended to reflect varying degrees of confidence. Some of these statements refer to emotions experienced in anticipation of speaking, others to experiences while speaking, and others to feelings at the conclusion of a speech.

The main experimental group of subjects who filled in the form were the 420 men and women enrolled in Fundamentals of Speech

at the University of Minnesota during the fall and winter quarters of the academic year 1941-42. The subject's report was made within forty-eight hours after having spoken before his class. He was asked to provide the information indicated at the top of the first page, and to complete the sentence, "The following material has reference to my recent experience in speaking before this class." He checked the rating scales and the list of descriptive terms, and then turned to the list of descriptive statements. Here he was instructed to encircle the "Yes" for all statements which he could accept as describing his experiences, "No" for those which did not describe his experience, and "?" if for any reason he was not sure. In responding to these statements as well as in filling out the other parts of the Report, the subject was asked to let his answers reflect as far as possible his actual experiences in his recent speech, rather than his impressions of the totality of his previous experiences in public speaking. The entire form, therefore, was used for the purpose of securing a direct report of the subject's feelings as experienced while making a particular speech at a particular time and place. The external features of the situation were very similar for all subjects with respect to the size and character of the audience and the type of speech delivered. The speeches on which the reports were based were given about four weeks after the beginning of the course.

SCORING METHODS

The two ratings at the top of the first page of the Report were averaged and will be referred to here as the PRCS (Personal Report on Confidence as a Speaker) Rating. The check marks among the descriptive terms at the bottom of the first page were summed, and will be referred to here as the Check List Score.

Three methods were tried out for the scoring of the 104 descriptive statements contained in the form:

1. Sum of the Yes Responses. In this scoring method a weight of minus one was given to each "yes" response among the first fifty-four items, and a weight of plus one was given to each "yes" response among the last fifty items. The score was calculated as the algebraic sum of the plus and minus values.
2. Sum of the Yes and No Responses. The first scoring method was extended to include the "no" as well as the "yes" responses, the algebraic sign of the former being the reverse of the latter for any given item.
3. Sum of the Weighted Responses. The reader will recall that the subject rated himself at the top of the first page of the Report before responding to the 104 descriptive statements, and these two self-ratings were averaged

1941-42

UNIVERSITY OF MINNESOTA

Fundamentals of Speech

PERSONAL REPORT ON CONFIDENCE AS A SPEAKER

Name..... Section.....
 Date..... Sex..... Age..... The following
 material has reference to.....
 Check the following scale to indicate your feelings just before and at the
 beginning of a speech.

extremely frightened and confused	frightened, doubtful of ability	somewhat worried but willing to talk	a little nervous but eager to speak	entirely confident and eager to talk
1.....|	2.....|	3.....|	4.....|	5.....

Check the following scale to indicate your feelings during the balance of the
 speech.

1.....|	2.....|	3.....|	4.....|	5.....
--------	--------	--------	--------	--------

Check all of the following terms which represent your feelings and experiences.
 Use column 1 to indicate feelings and experiences just before and at the begin-
 ning of speech. Use column 2 to represent feelings and experiences during the
 balance of the speech.

1	2	1	2
..... trembling	.....	..... nervous	.....
..... sweating	.....	..... dislike to look at	.....
		audience	
..... dry mouth	.....	..... fear of forgetting	.....
..... rapid heart beat	.....	..... anxious to finish	.....
..... blushing	.....	..... feel sickish	.....
..... short breath	.....	..... emotionally upset	.....
..... tense throat	.....	..... frightened	.....
..... tense face	.....	..... anxious	.....
..... tense body	.....	..... uneasy	.....
..... lose ideas	.....	..... jittery	.....
..... mental confusion	.....	..... embarrassed	.....

Encircle "YES," "NO," or "?" for all the following statements:

1. Yes No ? Audiences seem bored when I speak.
2. Yes No ? I feel dazed while speaking.
3. Yes No ? I like to pick out some friendly person in the group to whom
to address my remarks.
4. Yes No ? I am continually afraid of making some embarrassing or
silly slip of the tongue.
5. Yes No ? My face feels frozen while speaking.
6. Yes No ? I have a deep sense of personal worthlessness while facing
an audience.
7. Yes No ? Owing to fear I cannot think clearly on my feet.
8. Yes No ? The prospect of facing an audience arouses mild feelings
of apprehension.
9. Yes No ? I get up to speak with the feeling that I shall surely fail.

10. Yes No ? While making a speech I feel more comfortable if I can stand behind a table.
11. Yes No ? While preparing a speech I am in a constant state of anxiety.
12. Yes No ? I feel exhausted after addressing a group.
13. Yes No ? My hands tremble when I try to handle objects on the platform.
14. Yes No ? I am almost overwhelmed by a desire to escape.
15. Yes No ? I am in constant fear of forgetting my speech.
16. Yes No ? I dislike to use my body and voice expressively.
17. Yes No ? I feel disgusted with myself after trying to address a group of people.
18. Yes No ? I feel tense and stiff while speaking.
19. Yes No ? I am so frightened that I scarcely know what I am saying.
20. Yes No ? I hurry while speaking to get through and out of sight.
21. Yes No ? I prefer to have notes on the platform in case I forget my speech.
22. Yes No ? My mind becomes blank before an audience and I am scarcely able to continue.
23. Yes No ? I particularly dread speaking before a group who oppose my point of view.
24. Yes No ? It is difficult for me to calmly search my mind for the right word to express my thoughts.
25. Yes No ? My voice sounds strange to me when I address a group.
26. Yes No ? I feel more comfortable if I can put my hands behind my back or in my pockets.
27. Yes No ? My thoughts become confused and jumbled when I speak before an audience.
28. Yes No ? I am completely demoralized when suddenly called upon to speak.
29. Yes No ? I find it extremely difficult to look at my audience while speaking.
30. Yes No ? I am terrified at the thought of speaking before a group of people.
31. Yes No ? I become so frightened at times that I lose the thread of my thinking.
32. Yes No ? My posture feels strained and unnatural.
33. Yes No ? My legs are wobbly.
34. Yes No ? Fear of forgetting causes me to jumble my speech at times.
35. Yes No ? I am fearful and tense all the while I am speaking before a group of people.
36. Yes No ? I feel awkward.
37. Yes No ? I perspire while speaking.
38. Yes No ? I gasp for breath as I begin to speak.
39. Yes No ? I perspire and tremble just before getting up to speak.
40. Yes No ? I am afraid the audience will discover my self-consciousness.
41. Yes No ? I am afraid that my thoughts will leave me.
42. Yes No ? I feel confused while speaking.

43. Yes No ? I never feel that I have anything worth saying to an audience.
44. Yes No ? The faces of my audience are blurred when I look at them.
45. Yes No ? I feel that I am not making a favorable impression when I speak.
46. Yes No ? I find it extremely difficult to stand still while speaking.
47. Yes No ? I feel depressed after addressing a group.
48. Yes No ? I always avoid speaking in public if possible.
49. Yes No ? I am in a state of nervous tension before getting up to speak.
50. Yes No ? I become flustered when something unexpected occurs.
51. Yes No ? I lose confidence if I find the audience is not interested in my speech.
52. Yes No ? Although I talk fluently with friends I am at a loss for words on the platform.
53. Yes No ? My voice sounds as though it belongs to someone else.
54. Yes No ? At the conclusion of the speech I feel that I have failed.
55. Yes No ? I look forward to an opportunity to speak in public.
56. Yes No ? I like to experiment with voice and action to produce an effect upon an audience.
57. Yes No ? I usually feel that I have something worth saying.
58. Yes No ? I seek opportunities to speak in public.
59. Yes No ? I am fairly fluent.
60. Yes No ? I feel elated after addressing a group.
61. Yes No ? I can relax and listen to the speakers who precede me on the program.
62. Yes No ? I am not greatly disturbed if I think the audience does not agree with me.
63. Yes No ? I find it easy to move about on the platform.
64. Yes No ? My mind is clear when I face an audience.
65. Yes No ? I have no fear of facing an audience.
66. Yes No ? Public speaking is my favorite hobby.
67. Yes No ? Unexpected occurrences while speaking do not fluster me.
68. Yes No ? I have no serious difficulty in following the outline of my speech.
69. Yes No ? I feel poised and alert when I face an audience.
70. Yes No ? I enjoy preparing a talk.
71. Yes No ? I feel relaxed and comfortable while speaking.
72. Yes No ? I like to observe the reactions of my audience to my speech.
73. Yes No ? I like to use humorous stories and anecdotes.
74. Yes No ? I have a feeling of alertness in facing an audience.
75. Yes No ? Ideas and words come to mind easily while speaking.
76. Yes No ? Although I do not enjoy speaking in public I do not particularly dread it.
77. Yes No ? I do not mind speaking before a group.
78. Yes No ? I like to speak deliberately thinking my way through my subject.
79. Yes No ? Although I am nervous just before getting up I soon forget my fears and enjoy the experience.

80. Yes No ? I feel satisfied at the conclusion of the speech.
81. Yes No ? It is interesting to search for effective ways of phrasing a thought.
82. Yes No ? I have a feeling of mastery over myself and my audience.
83. Yes No ? At the conclusion of a speech I feel that I have had a pleasant experience.
84. Yes No ? New and pertinent ideas come to me as I stand before an audience.
85. Yes No ? I face the prospect of making a speech with complete confidence.
86. Yes No ? I take pride in my ability to speak in public.
87. Yes No ? Audiences inspire me.
88. Yes No ? Audiences seem interested in what I have to say.
89. Yes No ? Speaking in public is pleasantly stimulating.
90. Yes No ? I feel purposeful and calm as I rise to speak.
91. Yes No ? I feel expansive and fluent while before an audience.
92. Yes No ? I take greater pleasure in speaking than in any other activity.
93. Yes No ? I am not disturbed by the prospect of speaking in public.
94. Yes No ? Speaking in public is an exciting adventure.
95. Yes No ? I am neither excited nor frightened by the prospect of speaking in public.
96. Yes No ? I seldom have any difficulty finding words to express my thoughts.
97. Yes No ? I feel that I am in complete possession of myself while speaking.
98. Yes No ? I forget all about myself shortly after I begin speaking.
99. Yes No ? Although I do not enjoy speaking in public I usually accept an invitation to do so.
100. Yes No ? Speaking in public is a pleasurable experience unaccompanied by any doubts or fears.
101. Yes No ? I thoroughly enjoy addressing a group of people.
102. Yes No ? Audiences seem friendly when I address them.
103. Yes No ? At the conclusion of my remarks I feel that I would like to continue talking.
104. Yes No ? I find the prospect of speaking mildly pleasant.

to give the PRCS Rating. Each "yes" response made by the subject to the various items therefore had associated with it an averaged self-rating for nervousness. A weighted value was secured for each item by averaging the PRCS Ratings associated with it. Item values based upon the responses of men correlated .90 with those based upon the responses of women. The distributions for the two groups were pooled, final weights were computed, and a new set of scores on the 104 descriptive statements was calculated as the sum of the weighted values of all items to which the subject responded by encircling the "yes."

It might appear from a theoretical point of view that score 2 would be superior to score 1 since it permits a larger number of

items to contribute to the final result for each subject, and that score 3 would be superior to score 1 because it employs a more discriminating system of weights. However, score 1 was found to correlate .94 with score 2 and .91 with score 3, indicating that the subjects tend very markedly to maintain the same relative position regardless of scoring method. The ease and speed of the first scoring method, the algebraic sum of the "yes" responses, gives it a decided advantage over the other two. In the remainder of this article, PRSC Score will refer to the sums derived by that method.

ANALYSIS OF ITEMS

Since the 104 items in the Report were gotten up on a purely empirical basis, it was desirable to subject them to item analysis to determine which do not contribute to the differentiation of the subjects. The 420 Reports were arranged in order of the magnitude of their PRCS scores and divided into four groups of equal size with the men and women divided equally among the four quartiles. Table I presents the responses of the four groups to the items, with Q1 representing the most fearful group and Q4 representing the most confident group. For example, thirty-eight of the 105 men and women in Q1 encircled "yes" for the first item, "Audiences seem bored when I speak." Only four Q4 subjects encircled "yes" for that item, and the frequencies of the intermediate quartiles show a consistent and logical relationship. These facts are probably sufficient to prove the significance of the item, since such an arrangement of relative magnitudes would occur as a matter of chance less than five times out of one hundred. However, a further step was taken. The combined frequencies of the Q1-Q2 and Q3-Q4 were subjected to chi-square analysis.⁶ In the example at hand a sum of 21.406 was found.

A very large proportion of the items contribute significantly to the total scores. Items 9, 44, and 62 may be somewhat doubtful, and items 3, 8, and 10 quite definitely fail to show differentiation between the fearful and confident students. The frequencies of response as given by men and women to the 104 descriptive statements in the Report are presented in columns six and seven of Table I. The independence values are in parentheses, i.e., the frequencies which would obtain if they were strictly proportional to the number of

⁶ Garrett, Henry E., *Statistics in Psychology and Education* (New York, 1940), pp. 377-387.

TABLE I

ITEM ANALYSIS OF THE PERSONAL REPORT ON CONFIDENCE AS A SPEAKER

Item		MEN AND WOMEN				χ^2	MEN* f total	WOMEN** f total	χ^2	Total(%)
		Q1	Q2	Q3	Q4					
1.	y	38	12	9	4	21.406	27(26)	36(37)	.065	15
	n	32	62	66	77	10.092	99(97)	138(140)	.070	56
	?	35	31	30	24	1.200	46(49)	74(71)	.311	29
2.	y	36	20	10	1	29.794	24(27)	43(40)	.558	16
	n	61	83	89	102	6.578	143(137)	192(198)	.444	80
	?	8	2	6	2	.222	5(7)	13(11)	.935	4
3.	y	27	24	23	34	.334	34(44)	74(64)	3.836	26
	n	70	73	67	63	.621	120(112)	153(161)	.969	65
	?	8	8	15	8	1.250	18(16)	21(23)	.424	9
4.	y	39	31	15	5	27.778	37(37)	53(53)	.000	21
	n	56	68	84	94	9.656	119(124)	183(178)	.342	72
	?	10	6	6	6	.572	16(11)	12(17)	3.744	7
5.	y	27	14	11	1	15.592	22(22)	31(31)	.000	13
	n	70	83	86	102	3.585	137(140)	204(201)	.109	81
	?	8	8	8	2	1.384	13(11)	13(15)	.631	6
6.	y	35	10	13	3	13.581	18(25)	43(36)	3.321	15
	n	52	75	81	92	7.054	130(123)	170(177)	.675	71
	?	18	20	11	10	4.833	24(24)	35(35)	.000	14
7.	y	58	37	12	2	59.654	41(45)	68(64)	.606	26
	n	25	48	75	98	40.650	104(101)	142(145)	.151	59
	?	22	20	18	5	5.485	27(27)	38(38)	.000	15
8.	y	79	74	81	58	.672	116(120)	176(172)	.226	70
	n	14	18	15	35	3.952	32(34)	50(48)	.201	20
	?	12	13	9	12	.348	24(19)	22(27)	2.242	10
9.	y	8	2	4	0	2.572	5(6)	9(8)	.292	3
	n	89	99	97	104	.436	160(159)	229(230)	.010	93
	?	8	4	4	1	2.778	7(7)	10(10)	.000	4
10.	y	66	61	61	53	.703	110(99)	131(142)	2.074	57
	n	28	33	31	38	.492	41(53)	89(77)	4.587	31
	?	11	11	13	14	.520	21(20)	28(29)	.084	12
11.	y	41	26	21	4	19.174	32(38)	60(54)	1.613	22
	n	61	75	74	93	3.124	131(124)	172(179)	.668	72
	?	3	4	10	8	4.692	9(10)	16(15)	.166	6
12.	y	30	21	16	5	12.500	27(30)	45(42)	.514	17
	n	65	78	86	96	4.669	136(133)	189(192)	.115	77
	?	10	6	3	4	3.416	9(9)	14(14)	.000	6
13.	y	57	48	30	13	25.972	58(61)	90(87)	.251	35
	n	33	37	54	73	16.414	84(81)	113(116)	.187	47
	?	15	20	21	19	.342	30(31)	45(44)	.055	18
14.	y	14	3	1	0	14.222	6(7)	12(11)	.234	4
	n	77	97	100	105	2.531	158(155)	221(224)	.098	90
	?	14	5	4	0	9.416	8(9)	15(14)	.182	6
15.	y	56	35	17	4	43.750	45(46)	67(66)	.036	27
	n	39	56	74	91	18.846	105(107)	155(153)	.063	62
	?	10	14	14	10	.000	22(20)	26(28)	.343	11
16.	y	54	30	19	5	33.334	40(44)	68(64)	.614	26
	n	35	59	75	93	20.900	107(107)	155(155)	.000	62
	?	16	16	11	7	3.920	25(20)	25(30)	2.083	12
17.	y	57	29	17	8	33.232	33(46)	78(65)	6.274	26
	n	32	52	66	85	19.026	98(96)	137(139)	.071	56
	?	16	24	22	12	.486	41(30)	33(44)	6.783	18
18.	y	74	55	40	14	30.576	70(75)	113(108)	.564	44
	n	20	35	50	71	24.750	73(72)	103(104)	.024	42
	?	11	15	15	20	1.406	29(25)	32(36)	1.084	14
19.	y	29	6	2	0	28.685	14(15)	23(22)	.112	9

*N = 172

**N = 248

TABLE I (Cont'd)
ITEM ANALYSIS OF THE PERSONAL REPORT ON CONFIDENCE AS A SPEAKER

Item		MEN AND WOMEN				χ^2	MEN* f total	WOMEN** f total	χ^2	Total(%)
		f Q1	f Q2	f Q3	f Q4					
	n	60	87	98	105	8.960	144(143)	206(207)	.012	83
	?	16	12	5	0	15.589	14(14)	19(19)	.000	8
20.	y	30	11	3	3	25.542	8(19)	39(28)	10.689	11
	n	60	83	93	98	6.898	148(137)	186(197)	1.497	80
	?	15	11	9	4	4.250	16(16)	23(23)	.000	9
21.	y	61	56	39	30	12.388	82(76)	104(110)	.801	44
	n	33	39	50	64	11.011	68(76)	118(110)	1.424	44
	?	11	10	16	11	.750	22(20)	26(28)	.343	12
22.	y	21	8	3	2	16.942	13(14)	21(20)	.121	8
	n	58	84	97	100	8.900	143(139)	196(200)	.195	81
	?	26	13	5	3	20.042	16(19)	31(28)	.795	11
23.	y	28	19	12	5	14.062	18(26)	46(38)	4.145	15
	n	61	73	79	85	3.020	129(122)	169(176)	.680	71
	?	16	13	14	15	.000	25(24)	33(34)	.071	14
24.	y	88	73	54	26	27.116	94(99)	147(142)	.429	57
	n	11	20	29	54	23.720	46(47)	68(67)	.036	27
	?	6	12	22	25	12.757	32(27)	33(38)	1.584	16
25.	y	53	46	36	19	12.572	41(63)	113(91)	13.002	37
	n	43	52	61	74	6.956	117(94)	113(136)	9.518	55
	?	9	7	8	12	.444	14(15)	22(21)	.115	8
26.	y	67	50	44	30	9.636	101(78)	90(113)	11.463	45
	n	33	47	47	63	4.736	50(78)	140(112)	17.051	45
	?	5	8	14	12	4.250	21(16)	18(23)	2.650	10
27.	y	67	29	13	4	54.754	39(46)	74(67)	1.796	27
	n	22	47	62	92	32.259	95(91)	128(132)	.297	53
	?	16	29	30	9	.428	38(34)	46(50)	.791	20
28.	y	33	16	7	1	29.000	18(23)	39(34)	1.823	14
	n	42	68	80	97	15.591	115(118)	172(169)	.129	68
	?	30	21	18	7	8.894	39(31)	37(45)	3.487	18
29.	y	26	6	8	1	12.619	19(17)	22(24)	.402	10
	n	63	89	90	99	4.006	135(140)	206(201)	.303	81
	?	16	10	7	5	5.158	18(16)	20(22)	.432	9
30.	y	42	11	5	0	39.724	13(24)	45(34)	8.601	14
	n	42	83	90	104	14.881	142(131)	177(188)	1.568	76
	?	21	11	10	1	10.045	17(18)	26(25)	.096	10
31.	y	50	23	15	3	32.891	30(37)	61(54)	2.231	22
	n	35	64	81	93	20.533	120(112)	153(161)	.967	65
	?	20	18	9	9	7.142	22(23)	34(33)	.073	13
32.	y	61	47	29	11	31.244	61(61)	87(87)	.000	35
	n	34	46	59	84	17.723	87(91)	136(132)	.297	53
	?	10	12	17	10	.520	24(20)	25(29)	1.352	12
33.	y	38	32	29	11	8.182	43(45)	67(65)	.151	26
	n	58	61	68	86	4.474	108(112)	165(161)	.242	65
	?	9	12	8	8	.685	21(15)	16(22)	4.036	9
34.	y	65	52	31	20	25.928	67(69)	101(99)	.098	40
	n	29	37	64	78	27.770	85(85)	123(123)	.000	50
	?	11	16	10	7	2.272	20(18)	24(26)	.376	10
35.	y	50	23	9	2	45.762	25(34)	59(50)	4.002	20
	n	42	65	79	97	16.768	121(116)	162(167)	.366	67
	?	13	17	17	6	.926	26(22)	27(31)	1.243	13
36.	y	76	58	42	18	28.226	75(80)	119(114)	.533	46
	n	22	37	50	69	20.224	73(73)	105(105)	.000	42
	?	7	10	13	18	4.084	24(20)	24(28)	1.371	12
37.	y	33	34	21	17	7.943	58(43)	47(62)	8.861	25
	n	61	63	76	77	3.029	95(114)	182(163)	5.382	66

*N = 172

**N = 248

TABLE I (Cont'd)
ITEM ANALYSIS OF THE PERSONAL REPORT ON CONFIDENCE AS A SPEAKER

Item	f	MEN AND WOMEN				χ^2	MEN* f total	WOMEN** f total	χ^2	Total(%)
		Q1	Q2	Q3	Q4					
38.	?	11	8	8	11	.000	19(16)	19(22)	.972	9
	y	16	15	9	8	4.084	13(20)	35(28)	4.200	11
	n	79	84	92	92	1.270	148(142)	199(205)	.430	83
	?	10	6	4	5	1.923	11(10)	14(15)	.167	6
39.	y	53	36	32	30	4.803	66(62)	85(89)	.438	36
	n	40	56	55	72	4.295	85(91)	138(132)	.669	53
	?	12	13	18	3	.348	21(19)	25(27)	.359	11
40.	y	58	34	31	14	16.015	44(56)	93(81)	4.349	33
	n	34	55	58	81	10.964	104(93)	124(135)	2.197	54
	?	13	16	16	10	.179	24(23)	31(32)	.074	13
41.	y	67	45	30	13	30.526	57(64)	98(91)	1.304	37
	n	32	48	62	78	16.364	94(90)	126(130)	.301	52
	?	6	12	13	14	1.783	21(18)	24(27)	.833	11
42.	y	59	29	9	4	55.157	40(41)	61(60)	.041	24
	n	28	56	80	94	31.396	102(106)	156(152)	.256	61
	?	18	20	16	7	3.646	30(25)	31(36)	1.694	15
43.	y	33	17	5	2	31.897	13(23)	44(34)	7.289	14
	n	53	74	84	95	8.836	137(125)	169(181)	1.948	73
	?	19	14	16	8	1.414	22(23)	35(34)	.073	13
44.	y	15	3	7	2	2.929	11(11)	16(16)	.000	6
	n	76	99	94	98	.788	148(150)	219(217)	.045	87
	?	14	3	4	5	2.462	13(11)	13(15)	.631	7
45.	y	67	35	18	12	39.272	44(54)	88(78)	3.133	31
	n	20	44	53	59	13.090	73(72)	103(104)	.024	42
	?	18	26	34	34	5.143	55(46)	57(66)	2.988	27
46.	y	33	22	17	11	8.691	57(34)	26(49)	26.355	20
	n	67	73	74	85	1.207	98(123)	201(176)	8.632	71
	?	5	10	14	9	1.684	17(16)	21(22)	.108	9
47.	y	34	10	8	7	14.033	17(24)	42(35)	3.442	14
	n	62	80	88	95	5.160	137(133)	188(192)	.203	77
	?	9	15	9	3	4.000	18(15)	18(21)	1.029	9
48.	y	68	32	14	1	62.293	38(47)	77(68)	2.914	27
	n	24	52	73	94	33.942	106(100)	137(143)	.612	58
	?	13	21	18	10	.580	28(25)	34(37)	.603	15
49.	y	96	77	70	51	9.198	123(121)	171(173)	.056	70
	n	8	18	21	36	11.452	32(34)	51(49)	.200	20
	?	1	10	14	18	10.045	17(18)	26(25)	.096	10
50.	y	46	31	13	12	26.510	28(42)	74(60)	7.934	24
	n	36	52	72	78	16.152	100(98)	138(140)	.070	57
	?	23	22	20	15	1.250	44(33)	36(47)	6.241	19
51.	y	68	45	47	33	5.618	69(79)	124(114)	2.143	46
	n	21	35	34	51	5.930	67(58)	74(83)	2.373	34
	?	16	25	24	21	.186	36(35)	50(51)	.049	20
52.	y	88	41	17	7	71.598	55(63)	98(90)	1.727	36
	n	7	33	62	83	59.279	79(76)	106(109)	.201	44
	?	10	31	26	15	.000	38(34)	44(48)	.804	20
53.	y	42	34	23	15	12.666	31(47)	83(67)	9.268	27
	n	49	60	70	82	7.061	122(107)	139(154)	3.564	62
	?	14	11	12	8	.565	19(18)	26(27)	.093	11
54.	y	46	13	11	2	29.388	22(30)	50(42)	3.657	17
	n	32	56	72	95	24.383	107(105)	148(150)	.065	61
	?	27	36	22	8	11.596	43(38)	50(55)	1.113	22
55.	y	1	15	20	55	37.848	46(37)	45(54)	3.689	22
	n	93	76	51	22	38.082	82(99)	160(143)	4.940	58
	?	11	14	34	28	15.569	44(36)	43(51)	3.033	20

*N = 172

**N = 248

TABLE I (CONT'D)
ITEM ANALYSIS OF THE PERSONAL REPORT ON CONFIDENCE AS A SPEAKER

Item		MEN AND WOMEN				χ^2	MEN* total	WOMEN** total	χ^2	Total(%)
		Q1	Q2	Q3	Q4					
56.	y	9	22	42	66	42.358	59(57)	80(82)	.119	33
	n	76	62	45	22	24.476	83(84)	122(121)	.020	49
	?	20	21	18	17	.474	30(31)	46(45)	.054	18
57.	y	25	42	62	79	26.326	94(85)	114(123)	1.612	50
	n	55	28	18	5	33.962	32(43)	74(63)	4.725	25
	?	25	35	25	21	1.850	46(43)	60(63)	.352	25
58.	y	1	8	8	30	17.542	26(19)	21(28)	4.329	11
	n	98	88	78	53	9.516	119(130)	198(187)	1.578	75
	?	6	9	19	22	12.072	27(23)	29(33)	1.181	14
59.	y	15	37	54	87	40.835	79(79)	114(114)	.000	46
	n	62	32	18	3	45.948	41(47)	74(68)	1.295	27
	?	28	36	33	15	2.286	52(46)	60(66)	1.328	27
60.	y	6	9	12	43	22.858	36(29)	34(41)	2.885	17
	n	87	71	60	30	18.646	95(102)	153(146)	.816	59
	?	12	25	33	32	7.686	41(42)	61(60)	.041	24
61.	y	27	40	59	67	17.948	83(79)	110(114)	.343	46
	n	67	49	30	20	26.240	63(68)	103(98)	.623	40
	?	11	16	16	18	.806	26(25)	35(36)	.068	14
62.	y	34	39	38	56	2.630	72(68)	95(99)	.397	40
	n	48	47	48	35	.808	75(73)	103(105)	.093	42
	?	23	19	19	14	1.079	25(31)	50(44)	1.979	18
63.	y	17	34	41	58	15.360	85(61)	65(89)	15.915	36
	n	79	56	45	28	18.480	64(85)	144(123)	8.773	50
	?	9	15	19	19	3.162	23(25)	39(37)	.268	14
64.	y	14	26	56	86	57.164	75(75)	107(107)	.000	43
	n	75	43	20	4	62.226	55(58)	87(84)	.262	34
	?	16	36	29	15	.666	42(39)	54(57)	.378	23
65.	y	12	19	31	57	27.084	52(49)	67(70)	.313	28
	n	81	64	48	30	20.044	84(91)	139(132)	.909	53
	?	12	22	26	18	1.281	36(32)	42(46)	.848	19
66.	y	0	4	4	19	12.929	15(11)	12(16)	2.455	6
	n	104	96	87	69	5.438	138(146)	218(210)	.743	85
	?	1	5	14	17	16.474	19(15)	18(22)	1.794	9
67.	y	20	24	33	41	7.628	52(48)	66(70)	.562	28
	n	59	48	34	37	7.280	66(73)	112(105)	1.138	42
	?	26	33	38	27	.290	54(51)	70(73)	.299	30
68.	y	37	44	40	65	3.096	74(76)	112(110)	.089	44
	n	46	48	49	30	1.299	67(71)	106(102)	.382	41
	?	22	13	16	10	1.322	31(25)	30(36)	2.440	15
69.	y	0	8	21	57	56.976	36(35)	50(51)	.049	20
	n	97	69	45	18	46.130	86(94)	143(135)	1.155	55
	?	8	28	39	30	10.283	50(43)	55(62)	1.930	25
70.	y	22	33	54	76	30.247	78(76)	107(109)	.090	44
	n	69	53	41	17	22.756	69(74)	111(106)	.574	43
	?	14	19	10	12	2.179	25(23)	30(32)	.299	13
71.	y	0	1	12	54	62.147	31(27)	36(40)	.993	16
	n	100	87	57	20	45.834	101(108)	163(156)	.768	63
	?	5	17	36	31	22.512	40(36)	49(53)	.746	21
72.	y	29	61	86	96	31.118	109(112)	163(160)	.136	65
	n	52	27	9	4	47.348	36(38)	56(54)	.179	22
	?	24	17	10	5	12.072	27(23)	29(33)	1.181	13
73.	y	48	64	72	83	6.903	112(109)	155(158)	.140	64
	n	40	17	19	10	9.116	31(35)	55(51)	.771	20
	?	17	24	14	12	3.323	29(27)	38(40)	.248	16
74.	y	11	16	48	87	72.000	63(66)	99(96)	.230	39

*N = 172

**N = 248

TABLE I (CONT'D)

ITEM ANALYSIS OF THE PERSONAL REPORT ON CONFIDENCE AS A SPEAKER

Item	MEN AND WOMEN				χ^2	MEN* f total	WOMEN** f total	χ^2	Total (%)
	f Q1	f W2	f Q3	f Q4					
n	84	60	32	4	64.800	66(74)	114(106)	1.469	43
?	10	29	25	14	.000	43(32)	35(46)	6.411	18
75. y	2	14	36	57	53.910	51(45)	58(64)	1.363	26
n	96	75	42	17	54.540	86(94)	144(136)	1.152	55
?	7	16	27	31	14.951	35(33)	46(48)	.204	19
76. y	28	75	85	66	9.070	110(104)	144(150)	.586	60
n	55	15	10	22	14.156	32(42)	70(60)	4.047	24
?	22	15	10	17	1.562	30(26)	34(38)	1.036	16
77. y	21	46	56	82	24.476	90(84)	115(121)	.725	49
n	64	38	33	20	15.398	56(64)	99(91)	1.703	37
?	20	21	16	3	8.066	26(25)	34(35)	.069	14
78. y	36	36	59	64	13.276	98(80)	97(115)	6.867	46
n	52	38	21	25	14.236	41(56)	95(80)	6.831	32
?	17	31	25	16	.556	33(36)	56(53)	.420	22
79. y	21	41	72	88	43.262	97(91)	125(131)	.671	53
n	64	35	19	8	41.142	46(52)	80(74)	1.178	30
?	20	29	14	9	9.388	29(30)	43(42)	.057	17
80. y	14	22	45	62	35.014	68(59)	75(84)	2.337	34
n	61	37	21	9	36.126	48(52)	80(76)	.519	30
?	30	46	39	34	.067	56(61)	93(88)	.694	36
81. y	47	65	69	92	8.766	117(112)	156(161)	.378	65
n	39	22	16	7	17.190	33(34)	51(50)	.049	20
?	19	18	20	6	1.906	22(26)	41(37)	1.047	15
82. y	0	3	9	29	29.191	20(17)	21(24)	.904	10
n	98	82	58	31	30.674	103(110)	166(159)	.753	64
?	7	20	38	45	28.510	49(45)	61(65)	.602	26
83. y	2	13	32	73	67.500	56(49)	64(71)	1.690	29
n	84	60	31	8	59.924	62(75)	121(108)	3.818	44
?	19	32	42	24	1.916	54(48)	63(69)	1.272	27
84. y	12	28	40	63	27.569	68(59)	75(84)	2.337	34
n	81	56	48	25	19.504	79(86)	131(124)	.965	50
?	12	21	17	17	.029	25(27)	42(40)	.248	16
85. y	0	6	6	46	36.482	27(24)	31(34)	.640	14
n	99	88	65	32	28.522	103(116)	181(168)	2.463	68
?	6	11	34	27	24.820	42(32)	36(46)	5.299	18
86. y	0	3	6	37	34.782	24(19)	22(27)	2.242	11
n	99	86	73	33	21.377	104(119)	187(172)	3.199	69
?	6	16	26	35	18.119	44(34)	39(49)	4.982	20
87. y	2	12	18	54	39.116	35(35)	51(51)	.000	20
n	95	73	55	23	32.926	93(101)	153(145)	1.075	59
?	8	20	32	28	11.636	44(36)	44(52)	3.009	21
88. y	9	40	54	71	33.196	74(71)	100(103)	.214	41
n	60	21	10	1	53.260	36(38)	56(54)	.179	22
?	36	44	41	33	.234	62(63)	92(91)	.027	37
89. y	9	24	55	91	70.944	80(73)	99(106)	1.133	43
n	75	42	21	5	57.514	53(59)	90(84)	1.039	34
?	21	39	29	9	4.938	39(40)	59(58)	.042	23
90. y	4	4	13	37	30.414	27(24)	31(34)	.640	14
n	91	91	67	40	19.400	109(118)	180(171)	1.160	69
?	10	10	25	28	14.730	36(30)	37(43)	2.037	17
91. y	0	1	8	33	38.096	21(17)	21(25)	1.581	10
n	101	89	78	45	14.299	115(128)	198(185)	2.234	75
?	4	15	19	27	11.060	36(27)	29(38)	5.132	15
92. y	0	6	6	26	17.790	23(16)	15(22)	5.290	9
n	99	93	86	67	4.399	127(141)	218(204)	2.351	82

*N = 172

**N = 248

TABLE I (CONT'D)
ITEM ANALYSIS OF THE PERSONAL REPORT ON CONFIDENCE AS A SPEAKER

Item		MEN AND WOMEN				χ^2	MEN* f total	WOMEN** f total	χ^2	Total(%)
		f Q1	f Q2	f Q3	f Q4					
93.	?	6	6	13	12	4.474	22(15)	15(22)	5.494	9
	y	20	21	32	64	21.927	58(56)	79(81)	.120	33
	n	73	65	47	32	15.973	81(89)	136(128)	1.219	52
	?	12	19	26	9	.242	33(27)	33(39)	2.256	15
94.	y	20	47	45	72	13.586	92(75)	92(109)	6.504	44
	n	73	49	39	18	23.478	50(73)	129(106)	12.238	43
	?	12	9	21	15	3.897	30(23)	27(34)	3.571	13
	y	7	24	30	45	18.264	48(43)	58(63)	.978	25
95.	n	81	60	54	41	8.966	82(97)	154(139)	3.939	56
	?	17	21	21	19	.052	42(32)	36(46)	5.299	19
	y	12	25	40	49	21.460	55(52)	71(74)	.295	30
	n	78	65	47	39	14.130	93(94)	136(135)	.018	55
96.	?	15	15	18	17	.394	24(27)	41(38)	.570	15
	y	3	3	22	55	60.024	40(34)	43(49)	1.794	20
	n	95	82	56	25	35.720	91(106)	167(152)	3.603	61
	?	7	20	27	25	7.825	41(32)	38(47)	4.254	19
98.	y	14	35	50	65	26.560	67(67)	97(97)	.000	39
	n	80	52	34	21	31.543	74(77)	113(110)	.199	45
	?	11	18	21	19	1.743	31(28)	38(41)	.541	16
	y	26	48	53	47	3.886	70(71)	104(103)	.024	41
99.	n	60	34	23	32	10.146	58(61)	91(88)	.250	35
	?	19	23	29	26	1.735	44(40)	53(57)	.681	24
	y	1	6	6	14	6.071	13(11)	14(16)	.614	6
	n	101	88	85	62	5.250	128(138)	208(198)	1.230	80
100.	?	3	11	14	29	14.518	31(23)	26(34)	4.665	14
	y	0	12	21	66	56.260	48(41)	51(58)	2.040	24
	n	96	69	40	14	56.009	74(90)	145(129)	4.828	52
	?	9	24	44	25	12.706	50(42)	52(60)	2.591	24
102.	y	34	63	69	91	15.388	103(105)	154(152)	.065	61
	n	37	7	5	0	30.440	19(20)	30(29)	.084	12
	?	34	35	31	14	5.052	50(47)	64(67)	.326	27
	y	3	11	30	38	35.560	44(34)	38(48)	5.024	20
103.	n	92	73	48	42	21.976	90(105)	165(150)	3.643	61
	?	10	21	27	25	5.262	38(34)	45(49)	.798	19
	y	20	54	83	88	38.252	111(100)	134(145)	2.044	58
	n	62	29	9	5	55.941	32(43)	73(62)	4.766	25
104.	?	23	22	13	12	5.714	29(29)	41(41)	.000	17

*N = 172

**N = 248

men and women in the experimental group. The chi-square sums are given in column eight. There is a noticeable tendency for the women to answer "yes" to the statements reflecting fear more frequently than do the men, and to answer "yes" to the statements reflecting confidence less frequently than do the men. This trend reaches statistically significant proportions in items 17, 20, 23, 25, 30, 35, 38, 40, 43, 50, 53, 58, 63, 78, 92, 94, and 103. Items 26, 37, and 46 appear to be definite exceptions. Although the item analysis clearly shows sex differentiation, the trend was not strong enough

to produce a statistically significant difference between the average PRCS scores of the men and women in this study.

FUNCTIONS OF THE PRCS SCORES

Self-correlation. Scores based upon the odd-numbered descriptive statements correlated $.87 \pm .01$ with scores based upon the even-numbered statements. Correction by the Spearman-Brown formula for doubling the length of the material raises the correlation to $.93 \pm .01$. Retest scores on 117 subjects secured after four months of speech training correlated $.60 \pm .04$ with the original scores. Greater confidence was reported in the second test than in the first one, the critical ratio computed in terms of sigma being 5.00.

Correlations among the various types of scores provided by the Report were as follows:

	2	3
PRCS Scores (1)	$.72 \pm .02$	$-.69 \pm .02$
PRCS Ratings (2)		$-.69 \pm .02$
Check List Scores (3)		

Speech Skill. About ten days before the subjects in the main experimental group filled in the Report they delivered a three minute extemporaneous speech before their class groups. Each speaker was rated for general effectiveness on a nine point scale by his classmates. A judging committee was present, composed of two teachers and an advanced student in speech who rated each speaker for general effectiveness and checked the words and phrases on a prepared list⁷ which in their opinion described his behavior. A correlation of $.39 \pm .03$ was found between the averaged committee ratings and the PRCS scores, and a correlation of $.41 \pm .03$ between the pooled student ratings and the PRCS scores. Student ratings and committee ratings correlated $.70 \pm .02$ with each other. Association between speech skill and PRCS scores was also found in the analysis of the descriptive terms checked by the members of the judging committee. Table II gives the frequency with which the various traits were noted among the four PRCS quartile groups. For example, 32 of the 105 men and women in Q1 were described as "fidgety" by one or more of the three judges, as compared with 30 of the Q4 subjects. The sums of chi-squares in the next column indicate the statistical significance of the frequency differences found between Q1 and Q4. The

⁷ "Speech Problem Survey Scale," 1937, prepared by Franklin H. Knowler and Howard Gilkinson, (privately printed).

terms which differentiated most definitely between the fearful and the confident speakers were listless, little eye contact, little projection, little spontaneity, nervous, inanimate, and little facial expression. Most of these terms suggest inhibition.

The last three columns of Table II give the frequencies with which the various traits were noted among the men and women

TABLE II
DISTRIBUTION OF OBSERVED SPEECH FAULTS AMONG PRCS SCORE QUARTILES

	MEN AND WOMEN				χ^2	MEN	WOMEN	χ^2
	Q1	Q2	Q3	Q4				
<i>Attitudes and Behavior</i>								
fidgety	32	33	36	30	.065	73(53)	60(80)	12.547
inconsiderate	5	3	3	1	2.667	6(5)	6(7)	.343
listless	35	20	12	15	8.000	27(33)	55(49)	1.826
little eye contact	63	60	54	36	7.300	99(86)	117(130)	3.265
little projection	59	43	35	25	13.762	67(66)	97(98)	.025
little spontaneity	54	50	37	23	12.333	67(68)	102(101)	.024
mentally confused	14	10	9	7	2.273	19(17)	23(25)	.395
nervous	60	50	37	40	4.000	81(76)	109(114)	.548
not conversational	31	35	16	27	.276	43(45)	69(67)	.149
not serious	3	1	1	7	1.600	4(5)	8(7)	.342
withdrawing	16	6	6	9	1.923	15(15)	23(23)	.000
Total	372	311	246	220	39.027			
<i>Physical Activity</i>								
inanimate	54	55	34	25	10.525	63(66)	103(100)	.226
little facial expression	49	55	37	30	4.525	83(71)	95(107)	3.374
mannerisms	27	28	29	28	.035	54(47)	63(70)	1.743
not integrated	11	10	7	14	.385	24(17)	18(25)	4.842
poor posture	35	28	24	23	2.483	45(47)	73(71)	.141
random	42	29	29	28	2.800	66(52)	65(79)	6.250
weak	36	29	30	30	.545	45(51)	82(76)	1.180
Total	254	226	190	178	13.370			

speakers, the independence values, and the chi-square values. It appears that the judges found significantly more fidgetiness, lack of physical integration, and random behavior among the men than among the women. This outcome is of particular interest here because these same groups of subjects showed a corresponding differential response to item 46 in the Report, "I find it extremely difficult to stand still while speaking."

Intelligence and High School Grades. American Council Psychological Examination scores and high school percentile ranks were available at the University Testing Bureau for a considerable number of the subjects in the experimental group. These scores correlated as follows with the PRCS scores:

	Men	N	Women	N
Psychological Examination	.05	115	.12	178
High School Rank	.06	104	.02	173

Personality Test Scores. 212 of the women and 135 of the men in the main experimental group filled in the Minnesota Personality Scale⁸ two weeks prior to the time that the reports on confidence were submitted. The various scores yielded by the scale correlated as follows with the PRCS scores:

	Men	Women
I Morale	.14±.06	.17±.05
II Social Adjustment	.46±.05	.58±.03
III Family Relations	.24±.06	-.01±.05
IV Emotionality	.30±.05	.34±.04
V Economic Conservatism	-.06±.06	-.04±.05

RELIABILITY AND VALIDITY OF PRCS SCORES

In the most objective sense this is an investigation of the responses of a group of student-speakers to prepared material containing rating scales, check lists, and descriptive statements. Psychologically and phenomenologically it is a study of language behavior in a special situation, since the subject is confronted with a series of verbal formulations which he is asked to accept or reject according as they describe or fail to describe a designated previous experience. It is not necessary, perhaps, to call the reader's attention to the fact that when we refer to this as a study of *stage fright*, we do so with full realization that there may be many mediating functions as between the subject's experience and the report of his experience. He might be unwilling to reveal his feelings, and there may be individual differences in the extent and vividness of recall. There may also be idiomatic language preferences which determine individual and group responses to a given item. We must therefore infer the value, or meaning, of the Report from the way the subjects responded to the separate items and the way the PRCS scores correlate and differentiate in relation to other criteria.

A high degree of internal consistency is indicated by the odd-even correlation of .93. Retest scores did not correlate highly with the original scores, but there was an interval of four months and it may be reasonable to assume that the individuals adapted themselves to the situation at different rates and to different degrees.

Perhaps the most important external criteria are the ratings on

⁸ Darley, John G. and McNamara, Walter J., *Minnesota Personality Scale*, New York City.

speech skill and the descriptive terms checked by the judging committee. A number of these terms show significant and logical differentiation between the extreme PRCS quartiles, and a correlation of .39 was found between the averaged committee judgments on general speech effectiveness and the PRCS scores. In view of the rather low inter-correlations among the ratings of the three members of the judging committee, .41, .45, and .51, one might believe that the coefficient was considerably attenuated by lack of agreement among the judges. On the other hand, one half the student judges correlated .88 with the other half, and yet the correlation of their pooled judgments with the PRCS scores was only .02 higher than that yielded by the judging committee. Since there were between twenty and twenty-five students in each class, and in view of the very satisfactory reliability of their pooled judgments, it does not appear at all likely that simply adding more judges would greatly affect the coefficient of correlation between reported stage fright and speech skill. The reader may feel that the rather low order of relationship expressed among these data indicates lack of validity in the students' reports of their experience. It should be remembered, however, that we have no way of knowing how high the correlation should be if all measures were completely reliable and valid. Certainly it would be considerably less than unity, in view of the testimonials regarding stage fright which have come from persons of exceptional ability in the speech arts.

The correlations between the PRCS scores and other test data available in this study conform to antecedent expectations, at least from the point of view of this writer. A high degree of independence is demonstrated between these supposed reports of social fears and supposed measures of intellectual ability such as high school rank and ACE scores. The PRCS scores also show a discriminating profile of correlations with the various scores provided by the Minnesota Personality Scale. A moderate relationship with general social adjustment is shown, and a low but significant correlation with emotionality. According to the Manual of Directions for the scale, high scores on Social Adjustment "tend to be characteristic of the gregarious, socially mature individual in relations with other people. Low scores are characteristic of the socially inept or undersocialized individual." High scores on Emotionality "are representative of emotionally stable and self-possessed individuals. Low scores may result from anxiety states and over-reactive tendencies." Although the inter-correlation of pencil-and-paper forms may be an inherently weak method of validation, the emergence of relationships between reports of fear

and confidence in a specific social situation such as the speech class with measures intended to reflect social maturity and emotional stability is not without some significance.

Validity is a problem in much of the research carried on in psychology and education, and it presents particular difficulties in a study such as this one in which there is no objective and independent criterion against which the variable in question, reported fear and confidence, can be checked. The PRCS scores correlate .72 with self-ratings on nervousness, i.e., the PRCS ratings. This is a satisfactory outcome so far as it goes, but the ratings on nervousness can scarcely be regarded as constituting an "outside" criterion. The ratings on speech skill, on the other hand, are independent data, but we have no objective basis for our antecedent expectations regarding the probable relationship between overt speech behavior and emotional experience. Under these circumstances we are forced to deal operationally with the problem of validity, and to define the PRCS scores according to the way they function. The data presented in this article permit a partial definition, which will be supplemented by a later report on other phases of the investigation.

SUMMARY

This report is concerned with the more technical aspects of the problems involved in securing data on the feelings of fear and confidence experienced by college students in speaking before their classmates. Four hundred and twenty speech students were asked to describe their experiences through the medium of a list of statements intended to reflect varying degrees of fear or confidence. A fear-confidence index based upon these 104 descriptive statements was devised which is referred to here as the PRCS (Personal Report on Confidence as a Speaker) Score.

1. Experimentation with scoring methods failed to reveal any advantage for weighted scores as compared with the simple summation of the "yes" responses.
2. Item analysis showed that nearly all the 104 descriptive statements as originally chosen and worded contributed significantly to the total individual scores.
3. The women subjects exhibited more fear and less confidence in these reports than did the men.
4. A corrected odd-even reliability coefficient of .93 was found for the PRCS scores.
5. The PRCS scores correlated .72 with self-ratings on confi-

dence and —.69 with fear scores based upon a check list of descriptive terms.

6. The PRCS scores correlated .39 with ratings by teachers on general effectiveness, and .41 with ratings by students.
7. Groups of observers, composed of teachers and advanced students of speech, found significantly more listlessness and nervousness, and more frequent lack of eye contact, projection, spontaneity, and facial expression as overt symptoms in the speech behavior of the students whose PRCS scores reflected fear than among those whose scores reflected confidence.
8. The male subjects not only reported more frequently than the women that they had difficulty standing still while speaking, but also exhibited more fidgetiness, random behavior, and poorer physical integration than did the women.
9. There appears to be little or no relationship between the PRCS scores and intellectual ability as indicated by high school grades and intelligence test scores.
10. The PRCS scores showed a moderate correlation with social adjustment and a low but significant correlation with emotional stability as measured by a standardized personality test.
11. Over a period of four months of speech training the subjects showed a significant reduction in fear as reflected in averaged PRCS scores.
12. Initial scores correlated .60 with final scores showing that although the group as a whole seemed to acquire greater confidence during training there is a rather strong tendency for the individual to keep the same relative position in the total distribution of scores.

The remaining portions of this investigation, which will be reported at another time, consist of explorations into the relationships between the PRCS scores and such variables as the student's vocational choices, social activities and leadership, kinds and amounts of formal speech training and participation in extra-curricular activities, the manner in which he analyzes his individual speech problems and the type of evaluation he makes of his own ability, reading habits, health, physical fears and sensitivities, and general morale. The foregoing summary indicates that the Personal Report on Confidence as a Speaker has considerable value, at least for purposes of research. An examination of the practical implications of the study will be made when the remaining evidence is submitted.

DRAMATIC ASPECTS OF THE MEDIEVAL TOURNAMENT

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THE medieval tournament was more than a game of idealized warfare. It was one of the public rituals that held feudal society together; and it was one of the important forms of the drama.

Long before there were any theatre buildings or professional players in Western Europe, the people had begun to dramatize their public ceremonies—not only the Easter service and the Corpus Christi processions but also the official entry of the king into a city, the banquets of king and council, the entry of masked dancers to a court ball or of morris dancers to the seigneur's hall, and the tournament. The tournament was, in fact, perhaps the most splendid and most picturesque of them all. In it, as in the others, participants impersonated characters from folklore, from the romances of chivalry, from biblical story, or from classical mythology. Poets wrote speeches; musicians made songs; artists painted banners, shields, devices, and settings—much of the creative energy of the fifteenth and sixteenth centuries went into the dramatization of these traditional ritual forms.

It is no wonder that the tournament, the test of knighthood and the proof of chivalry, was made into a highly dramatic event by the addition of story, theme, speeches, dance, and pageantry. Already changed in the early Middle Ages from an actual combat to a ritualized game, it was so covered in the fifteenth and sixteenth centuries with the rich brocade of the dramatic imagination that it more resembled a play than a combat. And before it broke up into the horse ballets, the carrousels, and the military parades of the Baroque spectacles, it left a strong impression not only on imaginative literature but also on the patterns of the masques, operas, and plays.

Originally a serious combat, as between two leaders in an actual war, or a duel of private vengeance, or an official trial by combat to determine justice, the tournament by the thirteenth and fourteenth centuries was usually held for the fun of the contest. The purpose was not the death of an enemy or a culprit but the display and comparison of skill. Rules were devised, barriers were set up between the opponents, armor was redesigned, and weapons were blunted

in order that the danger should be greatly reduced.¹ The winner was not expected to really damage the opponent, or necessarily even to unhorse him, but an elaborate score was kept of such points as the number of lances well aimed, the number splintered, and the points hit, with demerits for hitting the horse or losing part of one's own armor. Yet even so accidents did occur, and after Henry II of France died in 1559 from a splinter that pierced his eye, the tournament was made even more harmless. When once a tournament was held without a real motivation in warfare or legal procedure, the first step was taken towards making it a dramatic game. As fictional motivations were devised, the way was opened for both the introduction of fictional characters and a dramatic framework for the whole event.

There were two parts of the tournament that especially lent themselves to dramatic development—the entry of the knights on the field and the challenge, or motivation for the separate contests. The Entry might be developed separately, with music, pageantry, and impersonation of historical or fictional characters, but where there was a story framework for the whole event, the Entry was usually planned as part of the same story.

The tournament was not the only occasion that saw a dramatic development of the Entry. In the fifteenth and sixteenth centuries, the official entries of kings or Lord Mayors were made impressive public events not only by the splendor of the accompanying procession but by the *tableaux vivants* erected along the way, from which orations or little plays invoked for the new ruler the glory of legendary and historical rulers.² At the festivals of the Chambers of Rhetoric in the Low Countries, prizes were given not only for the best triumphal entry into the town but also for the best procession to church. Each society devised characters, costumes, scenic devices, shields, and mottoes to illustrate some theme for the Entry. The little Saint George plays and other sword plays of the common people in England gave each new character a picturesque entrance to establish his identity with the audience.

¹ See the general account of the tournament in Cripps-Day, Francis Henry, *The History of the Tournament in England and in France* (London, 1918), and in Clephan, Robert Coltman, *The Tournament: its Periods and Phases* (London, 1919).

² Cf. Withington, Robert, *English Pageantry* (Cambridge, Mass., 1920) and Fairholt, Frederick W., *Lord Mayor's Pageants* (London, 1843 and 1844).

Likewise in the tournament the first entry of each knight on the field furnished an opportunity for theatrical embellishment. Froissart records the charming entry to the jousts in London in 1390 of sixty ladies mounted on palfreys, each leading a knight by a silver chain.³ The knights themselves were richly dressed, with a retinue carrying out the heraldic colors and devices or some special fancy for the occasion. It became a custom at the tournament, as with the Flemish Chambers of Rhetoric, to give a prize for the "fairest and most gallant entry." Segar records that such a prize was given at the tournament held in London on November 25, 1554, in honor of Philip and Mary, and he adds this comment: "In all which, and other the like triumphant Gestes perfourmed by the English and Spanish Nobilities, it was ever held honorable and prizeworthy to appeare within Listes most gallant and fairest armed and yet with least superfluous cost of golde, silver, embroidery, or curiositie of workemanship."⁴ On other occasions there was apparently no such effort to spare expense. In making a "gallant appearance," it was very natural to devise bizarre costumes. In 1561, at the tournament celebrating the marriage of William of Orange and Anna of Saxony at Leipsic, the costumes included those of Tartars, pilgrims, fools, hunting-monks, and Netherlands cuirassiers, and each group had its band of musicians in similar garb.⁵ The jousters for the Queen of Spain at Saint Jean de Luz in 1565 masqueraded as Egyptians, Spaniards, and men of other nations, as well as Amazons.⁶ At a tournament given at Kassel in 1596 by the Landgrave of Hessen for the entertainment of the Duke d'Alencon, the Seven Deadly Sins, the Nine Muses, the Four Cardinal Virtues, and other figures appeared in a procession before the tilting, each important participant presenting his "device."⁷ In one of the dialogues of Leone di Somi is mention of a costume ornamented with gold designed for a Rain-

³ *The Chronicle of Froissart*, trans. Lord Berners (London, 1901-2), V, 422 ff.

⁴ Segar, W., *Honor Military, and Civill, contained in foure Bookes* (London, 1602), p. 194.

⁵ Motley, John Lothrop, *The Rise of the Dutch Republic*, Everyman Ed., I, 275 f.

⁶ *Ample discours de l'arrivée de la Royne catholique, soeur du Roy, a Saint-Jehan-de-Luz* (Paris, 1565).

⁷ Nichols, John, *The Progresses and Public Processions of Queen Elizabeth* (London, 1823), III, 390.

bow to conduct a noble lord to the lists.⁸ At one of the series of jousts celebrating the marriage of Margaret of York and the Duke of Burgundy in 1468, the Comte de Roussy made his entry in a very spectacular way. First came a dwarf with a key, and behind him a castle with four towers and a gate that would open and close. When the group reached the royal gallery, the dwarf opened the gate of the castle with his key and revealed the Comte de Roussy mounted within.⁹

Frequently in the sixteenth century, pageant cars, such as those used in processions and in maskings in the great hall, made part of the Entry. At the beginning of the jousts in 1510 in honor of the English Queen, a pageant made like a forest with rocks and hills and a golden castle in the midst appeared. It was drawn by a golden antelope ridden by two ladies and led in by wild men. When it came to a standstill before the Queen, six foresters seated on it blew their horns and the device opened on all sides and four knights came out.¹⁰ At a tournament honoring Catherine de Medici and her daughter, there was a rich chariot with cloths of gold and clouds, drawn by four white hackneys. High up sat the goddess Venus and below were children dressed like Mercury singing. Another car had Cupid with more "Mercuries," who as the car went about the field delivered favors to the ladies.¹¹ At the tournament at Turin in 1618, called the Royal Amaranthus, the Prince of Savoy took the name of the Knight of the Royal Amaranthus, and his entry was very tasteful and harmonious. First were twelve trumpeters in blue, white, and amaranthus representing the winds, then a camel led by four African Moors in the same livery. There were also twelve pages on Spanish jennets representing the twelve hours of the day, with wings of silver, their heads covered with perukes made of golden threads with crowns of fleurs de lis, roses, hyacinths, and amaranths, beneath each of which seemed to shine a Great Sun made of plates of gold. Then there were six winged coursers drawing a triumphal chariot on top of which was Aurora, accompanied by Joy and Laughter playing on lutes and theorbos and singing.¹²

When there was so much attention to the spectacular entrance,

⁸ Nicoll, Allardyce, *The Development of the Theatre* (New York, 1937), 1st Dialogue, p. 233.

⁹ *Mémoire d' Olivier de la Marche* (Paris, 1883-4), III, 174.

¹⁰ Halle, Edward, *Henry VIII* (London, 1904), I, 22-23.

¹¹ Prunières, Henri, *Le Ballet de Cour en France* (Paris, 1914), p. 44.

¹² Clephan, *op. cit.*, pp. 136-138.

each knight was put to it to find a theme, an *impresa*,¹³ or a device that would stand out. Quite fantastic devices appeared both in actual tournaments and in the fictitious combats in the imaginative literature of the Renaissance. In the *Arcadia*, Sidney has one knight, man and horse, hidden in a great figure representing the phoenix, until the figure is burned on the field, letting the knight rise, as it were from the ashes.¹⁴ In his description of another knight, who appears as a frozen knight—frozen in despair—his armor representing ice, Sidney is apparently copying an actual entry of one of the participants in the Fortresse of Perfect Beautie Tournament played before Elizabeth in 1581.¹⁵ When all were vying in splendor, the one sure way of gaining attention was to forego all splendor. At this same tournament in the *Arcadia*, it was the device of one knight "to come in without any device, all in white like a new knight." The "unknown knight," usually in black armor, or the "humble knight" in poor armor, or the "wild knight," decorated with greenery, was a romantic figure both on the fields and in imaginative literature—witness the Green Knight in the romance of *Sir Gawain and the Green Knight* and Shakespeare's Pericles, who, shipwrecked on a strange coast, rescues a rusty suit of armor from the sea, enters a tournament, and wins both the prize and the daughter of the king.

But it was the Challenge, and not the Entry, which permitted an elaborate dramatization. The practice of delivering to the King or other Patron a cartel containing the challenge and the rules for the contest made an easy opening for the introduction of story. The motivation of the early challenges was very simple—the challenger was ready to meet all comers in order to uphold the honor of his country's knighthood, or to prove his chivalric devotion to some

¹³ The *impreses* were mottoes which were illustrated by a picture on a shield or by objects borne in the procession. In the sixteenth century, such an allegorical matching of visual symbol and verbal idea was extremely popular—witness the *tableaux vivants*, the masques, and the "poetical point" presented like a charade by the Chambers of Rhetoric in Flanders. See Nicoll, Allardyce, *Stuart Masques and the Renaissance Stage* (New York, 1938) especially Chap. VI, "Court Hieroglyphicks"; Denkinger, Emma, *Immortal Sidney* (New York, 1931); Denkinger, Emma, "The *Impresa* Portrait of Sir Philip Sidney," *Publications of the Modern Language Association*, XLVII, No. 1 (March, 1932), pp. 17-45; and Kernodle, George R., "From Art to Theatre in the Renaissance," in preparation.

¹⁴ Sidney, Philip, *The Countesse of Pembrokes Arcadia* (Cambridge University Press, 1922), p. 286.

¹⁵ Watson, Sara Ruth, "Chivalry in Elizabethan Literature," Ph.D. Dissertation, Western Reserve University, 1932, p. 118.

Lady (who might be, but usually was not, an object of personal attachment). Hundreds of tournaments were fought simply for "the honor of the ladies"; others stipulated some imaginary cruel lady whose favor the challenging knight hoped to gain. Or the theme might invoke some object or symbol or general idea without any clear statement of motive. The swan, symbol of the house of Cleves, was the only theme suggestion in the tournaments which accompanied the famous banquet at Lille in 1453.¹⁶ More fraught with dramatic possibilities was the challenge motivated by the desire to rescue virtue in distress. By summoning this motive underlying the whole chivalric scheme, one opened up rich stores of romance and legend, from the Arthurian material to the abstractions of the Court of Love.

Once the theme or motive of the tournament was established, further dramatic development was possible by the use of some scenic structure¹⁷ to suggest the basis of the fight. Heraldic and symbolic trees and fountains to hold the shields appeared in a number of tournaments under the Dukes of Burgundy.¹⁸ At the tournament given at Bruges in 1468 in celebration of the marriage of the Duke of Burgundy to Margaret of York, three elaborate structures were built. The contest was based on a giant whom a dwarf held prisoner. Each day the giant and dwarf watched from a platform under a golden pine tree, opposite the ladies. At one end of the lists was a door painted with a tree of gold and with a golden knocker, at which knights who wished to accept the challenge presented themselves. At the other end was a door with towers and banners, from which the defender of the field emerged. The end of the tournament led to the release of the giant.¹⁹ An even more pervasive story and a more elaborate setting were used the following year in Ghent by Claude de Vauldray. The "Chapitres" of the challenge told a long story of how the challenger, a man traveling in the country of Jeunesse in the plain of Plaisance between the Castle of Beauté and the mountain of Grace, was wounded in an encounter with Regart and was succored by the Dame Sauvage, for whose sake he had gone forth to win honor. At the entry, de Vauldray's procession con-

¹⁶ *Mémoire d'Olivier de la Marche*, II, 340 ff.

¹⁷ The scenic structures of the tournaments, pageants, and *tableaux vivants*, were derived from medieval art and contributed the characteristic forms and conventions to the Elizabethan stage and to most other theatres of the sixteenth century. They are studied in detail by George R. Kernodle in "From Art to Theatre in the Renaissance," in preparation.

¹⁸ *Ibid.*, I, 290 ff.; II, 118 ff.; and II, 202 f.

¹⁹ *Ibid.*, III, 101 ff.

sisted of four savage men, two of them leading white hackneys, on each of which was a *femme sauvage*, bearing the prizes of the tourney. They later sat on a scaffold over an elaborate entrance gate which was adorned with branches and greenery to resemble a wood.²⁰

It was the *scharmützel* (or assault on a castle) that permitted the complete dramatization of the entire tournament: the unification of all phases—challenge, entry, fighting, and denouement—by one story, the complete impersonation of fictional characters, and the control of the outcome of at least the final and crucial fights. The two favorite themes for an assault on a castle were the warfare between the Christians and the Infidels (the favorite enemies from the First Crusade to the end of the Renaissance) and the almost equally popular conflict of beautiful virtues attacked by demons or vices. In both cases the final outcome, even if individual fights might be left free, must be predetermined. Christians must win over Infidels,²¹ and knights of good must win over demons, evil magicians, or vices. At Fontainebleau in 1564, the knights attacked, and of course took, an enchanted castle that was defended by demons, the door guarded by a giant and a dwarf.²²

The peak of dramatization of the tournament was reached in the *scharmützel* staged at Binche in 1549 by Marie of Hungary, protector of The Netherlands, when the Emperor Charles V came to install his son Philip of Spain as the new ruler. As an opening for this tournament, a cartel read before the Emperor related the terrible deeds of Norabroch, a black magician dwelling in an enchanted castle near Binche, where he held captive many who had fallen into his evil power. His castle was said to be so strongly enchanted that it was continually enveloped in a thick cloud and no one could approach or even see it; hence it was called Tenebroso. It was known to be situated on the Isla Venturosa, which was approached by three passes guarded by three knights called the Colored Gryphon, the Black Eagle, and the Golden Lion, with whom all knights who sought to reach the Castle Tenebroso must fight. La Reina Fadada, a humane princess, had provided on the island long ago a means

²⁰ Prost, Bernard, *Traité de la Forme et Devis comme on Faict les Tournois par Olivier de la Marche* (Paris, 1878), pp. 58 ff.

²¹ Cf. the annual tournament at Toulette in Spain between men dressed as Moors and as Christians to re-enact the taking of the city from the Moors. Gachard, Louis Prosper, *Collection des Voyages des Souverains des Pays-Bas* (Brussels, 1876), I, 186.

²² Prunières, Henri, *op. cit.*, p. 45.

whereby Norabroch might be overcome. On a high cliff was a stone in which was embedded a sword of great virtue. The knight who could remove it would make an end of the enchantment and rescue the prisoners in Castle Tenebroso.

Next day the knights repaired to the field which had been set for the occasion. Each of the assailants had an assumed name, as Knight of the Blue Shield, Knight Without Hope, Knight of Death, etc. So, according to the terms suggested in the cartel, knight after knight fought and was defeated at one of the passes and was led prisoner to Castle Tenebroso. But at last the Knight Aventurero overcame the Golden Lion at the third pass. "Already," the chronicler continues, "the sun had set, night was approaching, and the heaven was covered with many thick clouds. And now in the Castle Tenebroso were frightful sounds, by which one knew that this man was the venturesome knight who should put an end to the strange adventure." Spectators jumped the barriers and climbed trees in order to see more clearly. Sure enough, the Knight Aventurero drew out the sword. Then there was the roll of thunder, and suddenly the cloud of painted cloth lifted from the castle. When the gate had been forced, other knights who had been imprisoned there rose as if from sleep. The conqueror freed them, and Norabroch was punished by being bound forever to an enchanted chair.²³

So ended the adventure of Castle Tenebroso, which had lasted all day and had involved many individual combats. The successful knight was of course Philip, not because he was powerful in arms (for he was not) but because he had to be the hero of the drama and to bring about the climax and denouement. One can be very sure that the gentlemen of the court had been coached in their parts—that each knew that however genuinely he might fight at the first two passes, he was on no account to go beyond the third—and that the Knight of the Golden Lion knew that the Knight Aventurero was to be let through. Lifting the sword and entering the castle then became but a part of the carefully set final scene, with the removal of the clouds of cloth, the disclosure of the castle, and the freeing of the prisoners. Here is as complete a drama as one finds in the history of the tournament—full motivation, an appropriate fictional setting, dramatic impersonation, a series of episodes leading to the triumph

²³ Calvete de Estrella, Juan Christoval, *El felicissimo viaje d'el . . . Príncipe D. Phelippe . . . desde España a sus tierras de la baxa Alemaña* (Antwerp, 1552), pp. 182 ff.

of a hero, and a climax prepared for and accompanied by sound effects and a scenic transformation.

Such was a tournament in its most developed form, when the element of combat was still taken seriously. But the chivalric ideals from which it derived were on the decline in a more sophisticated age, and the disintegration of the tournament was inevitable. The pattern of the ritual of the lists was to be still further embellished, and usually with extraneous decoration. For in the period of decline, though spectacle increased, the dramatic framework tended to dissolve. The original purpose and activity were lost in a maze of pretty accompaniments. The combat itself was sometimes all but hidden in accretions of costume, music, dance, and pageantry, and became really incidental.

The tournament was the more easily submerged and displaced by other forms of entertainment in the period of its decline because it had been used at times, even when it flourished most, as an incidental rather than a primary attraction. The various ways in which it made part of royal entries furnish a case in point. A tournament on the day following a monarch's entry to a city of his realm was a usual thing, and the jousts might be continued for several days thereafter; but here the tournament was really a major activity, in fact the climax of all the entertainments. But jousting might be used quite incidentally, as one of the little shows that the ruler paused for a few minutes on the line of march to see, or as a casual demonstration in a town square, without formal rules or elaborate arrangements for spectators. In fact, a little tilting might be introduced on any festive occasion, in hall or street. Henry VIII was noted for his interest in real jousting and for his skill on the field, and he sponsored many elaborate tournaments. But one is also aware in reading the records of his reign of a very large number of occasions when the tournament form was modified to fit the requirements of disguisings in the hall. For the Christmas revels in 1511, for instance, a pageant called Dangerous Fortress, in which were six ladies, was "assaulted" by six knights.²⁴ In 1518, on the occasion of the marriage agreement of the Dauphin and Lady Mary, a combination of tourney and masquing took place in the hall. A rock was erected there, on top of which were a lady with a dolphin in her lap and five trees bearing the arms of the Church, the Empire, Spain, France,

²⁴ Brewer, John Sherren and Gairdner, J., *Letters and Papers of the Reign of Henry VIII* (London, 1862-1903), II, 1497.

and England (those leagued against the Turk). Ten knights came out of a cave in the rock, fought a tourney, and returned. Then disguised ladies and gentlemen who had been sitting on the lower part of the pageant descended and danced and then, the rock opening to receive them, disappeared. Afterward Report came in on Pegasus and explained the meaning of the rock, the trees, and the tourney.²⁵ The warriors' sport had become the masquers' device. Another pretty combat occurred in 1527, when French ambassadors were being entertained at the court of Henry VIII. After dinner a person crowned with laurel entered the hall and made a speech. Then sixteen singers of the king's chapel entered leading two persons who held a debate, in the tradition of the Court of Love, on the relative merits of wealth and love, and when they could not agree each called in three knights to supplement the debate with a fight. Suddenly a gilt bar fell down between the two groups and the six knights fought at the barriers.²⁶

The extreme step of using the dramatic pattern of the tourney without any fighting was made quite early. Burlesque tournaments were popular in Spain, and mock castles were defended with such weapons as boiled eggs, gourds, and pumpkins.²⁷ In Heidelberg in 1613, the English princess and her party were entertained by a running at the tub in the fashion of Don Quixote, in whose name the challenge read. The courtiers were quite prepared, like Cervantes, to laugh away an old-fashioned ritual.²⁸

A more poetic and fanciful use of the tournament pattern appeared in Italy. In Venice, especially, there was a popular festival of the *Castello d'amore*, recorded as early as 1213, which featured a mock assault on a scenic castle with flowers as weapons;²⁹ and at Treviso in 1304 there was a castle in the market place from which ladies defended themselves with fruit, flowers, confetti, sweets, and fragrant liquids.³⁰ In England such a theme was adapted to the religious drama in the fifteenth century play of *The Castle of Perseverance*, with weapons of flowers as emblems of the Passion thrown by the virtues to burn the attacking vices. A very similar castle-game furnished the entertainment for the Shrove-Tuesday ball at

²⁵ Halle, Edward, *op. cit.*, I, 171-172.

²⁶ *Ibid.*, II, 86-87.

²⁷ *Crónica del Condestable Miguel Lucas de Iranjo* (Memorial historico español), VIII, 117-118 and 169-172.

²⁸ Green, Mary Anne Wood, *Elizabeth: Electress Palatine and Queen of Bohemia* (London, 1909), pp. 79-85.

²⁹ Conestrari, Guiseppe, *Il Castello d'amore* (n. d., n. p.).

³⁰ Sacchi, D. and G., *Antichità romantiche d' Italia* (Milan, 1828), p. 90.

the court of Henry VIII in 1522, when ladies bearing such names as Danger and Disdain defended a castle with rose water and comfits against men led by Ardent Desire, who threw in dates and oranges.³¹

There were still some tournaments held in the seventeenth century, but the operative posing of the Baroque aristocracy was satisfied by the spectacle and show without even the pretense of fighting. Hence far more attention was given to the horse ballet, an elaborate figured military parade, and to the carrousel, a ball game somewhat like polo. For both, the spectacular entry, the story, and the impersonation as developed in the dramatic tournament, were carried on. We can see in the costume designs made for the great carrousel of Louis XIV (published by Gregor in *Monumenta Scenica*) how the knights of the new age strutted and danced their horses about the field. What once was a dramatic tournament was imitated by a mere parade.

But before the tournament disappeared, it contributed to the modern theatre the relationship between the royal box and the pit. When Renaissance architects began to devise theatres for the palaces of dukes and kings in the sixteenth century, they had to adapt the Roman *cavea*—essentially a democratic auditorium—to the aristocratic courts. They combined it with the royal box, which on the tournament field stood at the center, well above the pit of activity. That royal box dominated the European theatre auditoriums into the eighteenth and nineteenth centuries, when the common people gradually sneaked back to look on at the entertainment of the rich.

The tournament for more than three centuries had belonged to all the nation. As the expression of the highest chivalric ideals of the feudal aristocracy, it served to unite all classes in devotion to those ideals. It demonstrated to all the people the glamorous superiority of their rulers. We used to consider that the important beginnings of the modern theatre dated from the Renaissance and Baroque courts. Only then, it is true, did a fully developed drama and theatre, free from all connection with church festivals or political ritual, emerge. But we see now that the earlier forms of dramatization, even if they were not given permanent form and could not be written down, were yet just as splendid as the later theatre-for-pure-entertainment and served a more important function in the life of the times. Before the Baroque kings drew all creative energy into the diversions of the court, feudal society was bound together by a

³¹ Halle, Edward, *op. cit.*, I, 239.

series of public rituals into which poets, painters, and singers poured their finest creations. The villagers expressed their loyalty to the manor house in the songs, dances, and drama of the folk plays; the citizens expressed their devotion to the church in the processions and plays of Corpus Christi day and their devotion to the king in the *tableaux vivants* of the inaugural Entries. The contribution of the nobility to the public ritual was the tournament. On the tournament field, kings and knights proved their right to rule by demonstrating their ability to protect the people and their power to invoke the glamor of history and legend.

We have too long overlooked the part these civic rituals played in the history of the theatre. By limiting our study of the medieval theatre to the religious plays, to the performances that have interested literary historians, we have lost sight of the fact that several other dramatic forms, which were sometimes even more important in the life of the times, received a development from ritual to art that was comparable to that of the mystery plays. Long before Shakespeare or the court operas, the people saw their favorite romantic stories and characters and their highest civic ideals dramatized in a series of public events. The most splendid of these events, the aristocratic tournament, must, we see, be considered as an important secular form of the medieval theatre.

